



# 2006 PREDESIGN MANUAL

## Table of Contents

---

<b>About the Manual</b> .....	1
<b>Section 1 – General Information about Predesigs</b> .....	3
<b>1.1 Introduction to the Predesign Study</b> .....	3
Purpose of the Predesign Study .....	3
Benefits of Predesign.....	5
When is a Predesign Study Required? .....	6
Use of Consultants.....	6
Audience.....	6
Overview .....	6
Predesign Study Funding Standards.....	8
<b>1.2 Predesign Review Process</b> .....	8
Timing of Submittal .....	8
Review and Approval Authority .....	8
Review Process <b>NEW!</b> .....	9
<b>1.3 Other Considerations</b> .....	10
Building Quality Standards .....	10
Energy Conservation .....	11
LEED Requirements <b>NEW!</b> .....	11
Coordination on Information Technology <b>NEW!</b> .....	11
Coordinate with the Department of Archeology and Historic Preservation <b>NEW!</b> .....	12
<b>Section 2 – Contents of a Predesign Study</b> .....	13
<b>2.1 Sections of a Predesign Study</b> .....	13
<b>2.2 Executive Summary</b> .....	14
<b>2.3 Project Analysis</b> .....	14
Operational Needs .....	15
Explore Alternatives.....	15
Select an Alternative .....	16
Scope and Project Description of Preferred Alternative .....	16
Issues Identification.....	17
Prior Planning and History .....	17
Stakeholders .....	17
Project Description.....	17
Implementation Approach.....	18
Project Management.....	19
Schedule .....	19

<b>2.4</b>	<b>Program Analysis</b> .....	20
	Assumptions .....	20
	Existing Facilities Inventory .....	20
	Space Needs Assessment.....	20
	Space Requirements .....	21
	Future Requirements .....	21
	Codes/Regulations.....	22
<b>2.5</b>	<b>Site Analysis</b> .....	22
	Evaluating Potential Sites.....	22
	Minimizing Costly Mitigation Requirements.....	22
	Acquisition Process .....	24
	Projects without Selected Sites.....	24
	Preferred Site(s).....	24
<b>2.6</b>	<b>Project Budget Analysis</b> .....	24
	Relate the Budget to the Scope of Work .....	25
	Effective Utilization of Space .....	25
	Cost Estimating versus Cost Planning.....	26
	Projects Outside Cost Control Ranges .....	26
	Funding Sources.....	26
<b>2.7</b>	<b>Master Plan and Policy Coordination</b> .....	26
	Thurston County Master Plans .....	27
	Other Significant State Requirements .....	27
<b>2.8</b>	<b>Facility Operations and Maintenance Requirements</b> .....	27
	Operating Budget Impacts.....	27
<b>2.9</b>	<b>Project Drawings/Diagrams</b> .....	28
	Site Plans .....	28
	Building Plans .....	28
	Building Volumes.....	28
<b>2.10</b>	<b>Appendix</b> .....	28

## APPENDICES

A - Predesign Checklist 	.....	A-1
B - Program Analysis Section Detail .....		B-1
C - Site Analysis Section Detail .....		C-1
D - Project Budget Analysis Section Detail .....		D-1
E - Guidelines for Preparing Capital Project Cost Estimates (Form C100).....		E-1
F - Forms .....		F-1
C4 – Predesign Capital Project Request Report Summary .....		F-3
C100 – Agency/Institution Project Request.....		F-5
C3 – Benefit and Life Cycle Cost Analysis Summary .....		F-8
G - Glossary of Terms .....		G-1



## About the Manual

---



The Office of Financial Management (OFM) has updated this manual with input from legislative staff, agencies and institutions to provide a framework for preparing and conducting a predesign study. It is also the model by which studies will be evaluated during the budget review process.

If you would like copies or have questions about this manual or predesign studies, please contact the OFM capital budget assistants.

Look for the  sign to find items required for submittal

Use this symbol to help you find predesign submittal requirements quickly.

Look for the  sign for new items

We have used this symbol to flag any new or revised requirements or tools from the last manual. Changes in the manual are:

- ❑ Requirement to design, construct and certify buildings over 5,000 square feet to Leadership in Energy and Environmental Design (LEED) silver standard
- ❑ Project request report requirement moved to the capital budget instructions. For more information, see <http://www.ofm.wa.gov/budget/instructions/capital.asp>
- ❑ Review process with agency
- ❑ Coordination with Department of Information Services
- ❑ Coordination with Department of Archeology and Historic Preservation
- ❑ Consultation with the Department of Archeology and Historic Preservation and affected tribes
- ❑ Building quality guidelines
- ❑ Submittal of predesign checklist





## SECTION 1

# General Information about Predesigns

---

## 1.1 Introduction to the Predesign Study

---

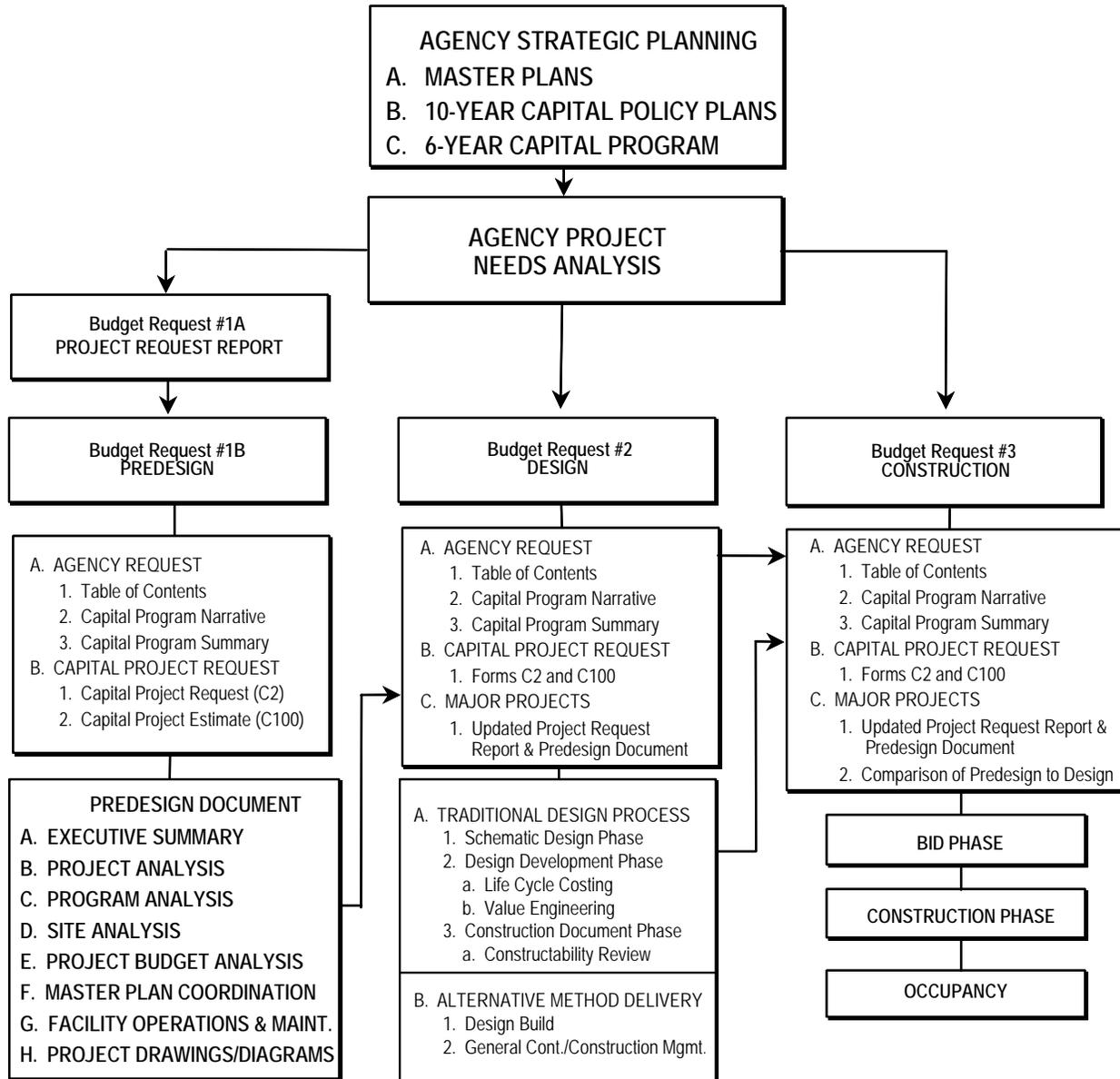
### **Purpose of the Predesign Study**

Key to the success of any capital project is a clear, accurate, and specific understanding of the facility need/problem to be addressed and a thoughtful analysis of the options to meet the need or solve the problem.

The predesign process is a decision making tool for large capital budget expenditures. The intent of a predesign study is to investigate facility alternatives for public service delivery or administration. It should assess which alternative best solves a specific problem and at what cost. This will assist decision makers in determining whether the project should proceed to design and construction.

During the predesign process, the agency or institution answers specific questions designed to ensure full understanding of the viable alternatives to resolve the facility need that has been identified. The facility need should be directly related to the delivery of public service. These questions include the refinement of the scope, project management, schedule, quality, budget, and location of a project by answering the questions of who, why, what, where, when, and how much. Completion of the Predesign Study is the second step in requesting funding from the Legislature for a proposed project. Figure 1 shows the Predesign Study as part of the capital project process and its relationship to the Project Request Report, Design and Construction.

**Figure 1**  
**State of Washington**  
**CAPITAL BUDGET PROCESS - MAJOR PROJECTS**



Issued by: Office of Financial Management

The Predesign Study involves data collection, analysis, organization, communication, and evaluation through which all viable alternatives and elements of the selected facility's design shall be explored. It includes the establishment of an agency or institution's programmatic, qualitative, financial, schedule requirements, and limitations for a project. It should explore the physical attributes of a facility, as well as the design response to meet service delivery and facility user needs.

While the predesign is a solid foundation from which to begin design, it does not impose constraints that cannot be altered during the design process if additional information becomes available. Reasonable flexibility, within legislative intent, during the design and construction process is expected and encouraged. Scope changes must be communicated to the agency's or institution's capital budget analyst at OFM.

**Benefits of Predesign**

Experience has shown that high quality predesign studies provide a number of benefits:

- Better planning by agencies and institutions yields better results;
- Better communication for funding requests;
- Agencies and institutions have an opportunity to discover alternatives that had not been previously considered;
- Agencies and institutions make more informed decisions with more complete information;
- Risks can be identified and minimized through a more rigorous process;
- Agencies and institutions can improve internal program planning, and cost or schedule issues not previously known (like utility extensions and geotechnical issues) can be explored before large sums of money are invested;
- An opportunity is presented to review total project budgets prior to the design phase; and
- Long-term planning offers the best potential for cost savings.

**When is a Predesign Study required?**

Major projects - those with an estimated cost of \$5 million or more, that are particularly time sensitive, high risk, or incorporate state-of-the-art technology - are required to conduct a Predesign Study. Projects under \$5 million should include a predesign phase when the project has significant policy implications or technical, logistical, or cost concerns to a program or agency. Although this manual is designed for major projects, it is also recommended for use on smaller projects.

**Use of Consultants**



Typically much of the work to produce a Predesign Study is undertaken by the agency or institution, but it is common for professional consultants to be hired to complete some of the required technical aspects.

However, it is OFM’s intent that all possible portions of the work be prepared by staff of the agency or institution, especially those sections related to programming and institutional needs.

**Audience**

Various audiences use the predesign document. Interested parties include: the project design team, agency or institution project staff and management, agency or institution executive management, the Legislature, OFM, Department of General Administration, and the public. With this in mind, this manual has been prepared to promote consistency in predesign studies submitted by various agencies and institutions.

**Overview**

The Predesign Study should provide the following information, at a minimum, regardless of which options analyzed in the study are selected:

For additions, renovations, and new facilities:

- A description of the service delivery needs to be met – the problem;
- An architectural/functional program and thorough explanation of the scope of work;
- An analysis of potential and recommended project site(s);
- An analysis of existing building conditions for remodels and upgrades;
- A project budget in the format of the Project Cost Estimate Worksheet (Form C100);

- Cost/benefit and life-cycle cost information for major decisions involving economic trade-offs;
- A discussion of relevant master plans and other planning documents that affect the project;
- A thorough analysis of the operating impacts of the project including FTEs and operating and maintenance costs.
- A complete set of conceptual or preliminary drawings (prior to schematic design phase).

For infrastructure (such as electrical, water, sewer, roofs, and roads) preservation/replacement projects:

- A description of the service delivery needs to be met – the problem;
- A thorough explanation of the scope of work;
- An analysis of the existing infrastructure conditions and maintenance impacts including an engineer's report analyzing the problems and identifying potential solutions;
- A project budget in the format of the Project Cost Estimate Worksheet (Form C100);
- Cost/benefit and life-cycle cost information for major decisions involving economic trade-offs;
- An analysis of how future needs and growth is accommodated;
- A discussion of relevant master plans and other planning documents that affect the project;
- A discussion and recommendation regarding the project delivery and agency project management process to be used;
- Conceptual drawings (prior to schematic design phase); and
- Operating and maintenance impacts.

**Predesign Study Funding Standards**

Agencies may receive an appropriation to assist them in conducting a Predesign Study. Appropriations should be made through the budget process prior to proceeding with a predesign in order to cover the costs and establish legislative intent for the project. The Contents section of this manual describes those sections of the study that these funds will finance.

Predesigns are generally about 1 percent of the total project budget depending on the magnitude and complexity of the project. See below for additional funding guidelines.

**Predesign Study Funding Standard**

Type of Project	Project Cost in Millions			
	\$5 - \$10	\$10 - \$20	\$20 - \$40	OVER \$40
Complicated	1.35%	1.10%	0.75%	0.65%
Standard Design	1.20%	0.90%	0.65%	0.55%
Uncomplicated	1.00%	0.70%	0.50%	0.50%

Note: Percent is based on total estimated project cost and is more applicable to new facilities. Infrastructure preservation/replacement projects should require less funding.

**1.2 Predesign Review Process**

---

**Timing of Submittal**

The Predesign Study, if approved, establishes the project budget for design and construction funding. To qualify a project for consideration in the next biennial capital budget, the Predesign Study should be submitted no later than July 1 of even-numbered years.

**Review and Approval Authority**

RCW 43.88.110 requires that: “The office of financial management, prior to approving allotments for major capital construction projects valued over five million dollars, shall institute procedures for reviewing such projects at the predesign stage that will reduce long-term costs and increase facility efficiency. The procedures shall include, but not be limited to, the following elements:

- (a) Evaluation of facility program requirements and consistency with long-range plans;
- (b) Utilization of a system of cost, quality, and performance standards to compare major capital construction projects; and
- (c) A requirement to incorporate value-engineering analysis and constructability review into the project schedule.”

The 2005-07 capital budget (section 903) also requires that the Predesign Study be submitted to OFM for review and approval:

“To ensure that major construction projects are carried out in accordance with legislative and executive intent, appropriations in this act in excess of \$5,000,000 shall not be expended or encumbered until the office of financial management has reviewed and approved the agency’s **predesign** and other documents, and approved an allotment for the project that includes specific authorization to enter into a contract to expend or encumber funds. The predesign document shall include but not be limited to program, site, and cost analysis in accordance with the predesign manual adopted by the office of financial management.”

## Review Process



The review and approval of a predesign by OFM is an iterative process with the agency. Before starting the predesign, the agency should arrange a meeting with its assigned OFM capital budget assistant to discuss items such as scope, funding, schedule, alternatives, and document expectations. Regular status meetings may also be scheduled. Near completion of the final draft of the predesign, the agency should schedule a presentation to start the formal review process with OFM. During the OFM review process, changes or additional information may be required before the predesign is formally approved by OFM. Agencies and institutions should make appropriate arrangements for the time and cost involved in this process.

OFM has developed an internal review process for conducting predesign evaluations. The Budget Evaluation Study Team (BEST) review will be used on selected predesigns. Independent qualified multi-disciplined teams using Value Engineering (VE) methodology will conduct the reviews. The OFM budget staff evaluates other predesign studies in-house.

Predesign Study review by either OFM budget staff or an independent BEST team encourages a better study. The result is more cost-effective designs, early identification and resolution of issues, lower costs, and improvements in safety, security, and aesthetics.

OFM has structured both the in-house review and BEST review of predesign studies to analyze the following:

- **Prevention of Project Scope Creep** – Reviews are designed to ensure the inclusion of all needed program elements and eliminate the elements that are not necessary to meet the project intent or scope. Scope creep occurs when missing items in a project are discovered late in design development resulting in costly changes and additions to the project scope. Developing a comprehensive study and performing a thorough review of the study helps to establish an appropriate budget for the project right from the start.
- **Space and Quality Standards** – Reviews analyze both facility space requirements and proposed construction materials to ensure compliance with established standards. In some designs, the program allocating space does not meet the project’s real needs or is used inefficiently. By analyzing the Predesign Study, the functional requirements of the project can be adjusted without detracting from the essential function.
- **First Cost and Life-Cycle Cost Analysis** – Reviews provide the opportunity for cost savings while still meeting project objectives. During the review of a Predesign Study, the greatest opportunity exists to change designs, which can impact not only the first cost but also more importantly, small increases in first cost can significantly reduce the life-cycle costs.

## 1.3 Other Considerations

---

### **Building Quality Standards**

The predesign process should clearly document and justify the building quality standards for the project. Since quality is directly related to performance and cost, the budgeting and design of the project should take into account what level of performance is acceptable for the facility and its systems.

**Energy Conservation**

The cost of energy consumed by energy management systems and renewable energy systems in state facilities and the maintenance of the systems shall be considered in addition to the initial cost of constructing such systems.

RCW 39.35 requires that the design and use of energy systems in publicly owned and leased facilities include consideration of renewable energy resources (solar, wood or wood waste), other non-conventional fuels and energy management systems. Current law also provides for energy efficiency measures in public buildings and specifies duties of the Department of General Administration in implementing conservation measures in state facilities. Contact the Energy Section, Division of Engineering and Architectural Services, Department of General Administration at (360) 902-7194 or 902-7272 for technical assistance.

**LEED Requirements**

Chapter 12, Laws of 2005 (ESSB 5509) requires all state-funded projects with buildings over 5,000 square feet that have not entered the design phase prior to July 24, 2005, to be designed, constructed, and certified to at least a LEED (Leadership in Energy and Environmental Design) silver standard.

Contact the Energy Program, Division of Engineering and Architectural Services at (360) 902-7194 or (360) 902-7272 for technical assistance.

**Coordination on Information Technology**

The Information Services Board (ISB) has authority over the purchase of all information technology (IT) investments made by executive and judicial branch agencies. The ISB may delegate this authority to agency directors. During the predesign process, coordinate any information technology requirements with the agency's or institution's technology management consultant to ensure that the project is in compliance with RCW 43.105 and the Information Technology Investment Policy. The investment policy and list of consultants can be found at <http://www.dis.wa.gov/portfolio/200P.htm>.

**Coordinate with the  
Department of  
Archeology and  
Historic Preservation**



Executive Order 05-05 "Archeological and Cultural Resources" ([http://www.governor.wa.gov/actions/orders/eo\\_05-05.htm](http://www.governor.wa.gov/actions/orders/eo_05-05.htm)) requires the Department of Archeology and Historic Preservation (DAHP) and affected tribes to review capital construction projects to determine potential impacts to cultural resources. During the predesign study, agencies shall notify DAHP and affected tribes of potential sites for the project. A letter from DAHP regarding the impact of potential sites on cultural resources shall be included in the study.



## SECTION 2

# Contents of a Predesign Study

---

## 2.1 Sections of a Predesign Study

---

**The Predesign Report is an eight-part report with an appendix.**

The predesign should build upon the information generated in the project request report submitted with the agency's or institution's ten-year plan and must have the following standard sections:

- 1.0 Executive Summary**
- 2.0 Project Analysis**
- 3.0 Program Analysis**
- 4.0 Site Analysis**
- 5.0 Project Budget Analysis**
- 6.0 Master Plan and Policy Coordination**
- 7.0 Facility Operations and Maintenance Requirements**
- 8.0 Project Drawings/Diagrams**
- 9.0 Appendix**

The sections of a Predesign Study allow for some flexibility in required content based on the needs of the project. For example, an addition to a building may not need an analysis of several sites or a new geotechnical study. An infrastructure preservation project of little complexity may focus more on existing conditions and less on program analysis.

The following pages contain a generic model for a complete Predesign Study that will be followed by all agencies and institutions when requesting approval for major projects. When a section is not applicable, justification of the omission must be provided in that section of the document. A predesign checklist (located in Appendix A) is provided to help ensure that the predesign submission contains all relevant information.

Any other information the agency or institution believes would be helpful should also be included as an appendix to the document. OFM may require additional information for unique projects.

## 2.2 Executive Summary

---

The Executive Summary section presents essential and high-level information about the project to agency or institution management and stakeholders. It clearly states the problem and solution, and also summarizes material that is presented in subsequent sections. The Executive Summary should not require an extensive technical or contextual background to understand.

The summary should also be contained in the C-4, Predesign Capital Project Request Report Summary (see Appendix E). The form can also be found at <http://www.ofm.wa.gov/budget/instructions/predesign/contents.asp>

## 2.3 Project Analysis

---

The Project Analysis section describes the operational needs, alternatives, scope of the preferred alternative, prior planning, implementation approach, and schedule. It also includes the management method to be used. If an alternative methods contracting process – design-build or general contractor/construction manager (GC/CM) – is recommended, it should be documented and justified in this section and the corresponding costs should be included in the Project Budget Analysis section.

**Operational Needs**

This subsection contains a discussion of the statutory and other requirements that drive the operational program and service delivery issues. When developing the predesign, discuss the agency's mission, goals and objectives, and how the predesign supports them. Discuss how the operational needs tie to the strategic framework developed from the Priorities of Government budget approach.

Explain the connection between the agency strategies, related activities, the statewide results, and the predesign. For more information on strategic planning, refer to Part I of the operating budget instructions

(<http://www.ofm.wa.gov/budget/instructions/operating.asp>).

Other items to consider include:

- What are the statutory or judicial requirements that drive the project's operational programs? How do these affect the need for space, location, or physical accommodations?
- Provide a discussion and spreadsheet that details future population projections and growth or decline including the assumptions behind the projections. Distinguish between mandatory requirements and non-mandatory requirements for future changes. For example, a mandatory caseload or enrollment change arises from an explicit statutory requirement for state-funded services. A change in the demand or the need for a service is not mandatory unless the recipients of that service or benefactors of the activity are entitled by statute or rule.
- Summarize the agency's or institution's approved operational program for the project. Detailed information belongs in the report appendix.
- Where did the approval for the program originate? What divisions or programs will be part of the project? How many FTEs are involved? Who will pay? (Also see the project budget analysis section.)

**Explore Alternatives**

Explore and summarize the alternatives that have already been or will be considered to meet the project's operational program and service delivery requirements. Frame the discussion using the following categories, if applicable, over a ten-year timeframe:

- Colocation and/or consolidation
- Renovation
- Rearrangement of uses or users (adjacency needs, back-filling scenarios)
- Leasing
- Other operational options that may affect need such as new federal loans, sentencing changes, Governor's initiatives affecting enrollment
- No action

Be sure to address the “no action” alternative. Describe the consequences to the public service delivery, stakeholders and client groups of not building, remodeling or renovating. Discuss the connection of each alternative to the agency's or institution's mission, strategies, related activities and statewide results. Other categories may be added.

The best predesigns are persuasive not only at the agency level but within the broader statewide context that the Governor and Legislature must consider in making decisions. A stronger case is made by predesigns that discuss the value and benefits of measurable outcomes they intend to deliver to the state.

### **Select an Alternative**

Based on a thorough analysis of operational needs and the proposed alternatives, select the preferred alternative. Discuss the reasons for the proposed solution to the service delivery issue. Include a discussion of the anticipated results from the proposed project.

### **Scope and Project Description of Preferred Alternative**

Further detail the scope of the preferred alternative. What is it? Is it new space or remodeled space and systems? Is it a new building or renovation of an existing building with new space added on? Where is it? When is it proposed? Ensure that the scope of the preferred alternative is consistent with the capital budget instructions; for example, equipment criteria, use of surge space, etc. The summary statement is a description that will stay with the project through its completion and occupancy of the facility. This statement can also serve as an introductory paragraph to appropriation language and can be used in capital budget request forms.

In the alternative discussion, address different levels of funding options. If the request is for a new building with a total cost of \$30 million, what would \$20 million provide? What would not be provided?

<b>Issues Identification</b>	Expand on the issues identified in the project request report submitted with the agency's ten-year plan, particularly those that will need further study. The issues might include information technology, energy conservation, telecommunications and transportation demand management, architectural and engineering programming, general design concepts, sustainable building practices, and operational savings. Conduct a sustainable design charette to discuss and clarify sustainable design opportunities. Provide a summary of the charette in the appendix of the predesign document.
<b>Prior Planning and History</b>	Include any relevant history of the project, including any previous versions that did not go forward to predesign, design or construction. Many projects have been the wrong project for that particular time. If applicable, provide a summary of the history of repair costs and the current state of repair of the building(s) or facilities involved.
<b>Stakeholders</b>	Discuss all other agencies, organizations, and stakeholders affected by or involved in this project, for example, local and tribal governments, agencies with regulatory jurisdiction, users of the facility, etc.
<b>Project Description</b>	<p>Use the Predesign Capital Project Request Report Summary (Form C-4 in Appendix F) to detail project specifics including:</p> <ul style="list-style-type: none"><li>▪ Agency Name – Name of agency requesting funding.</li><li>▪ Agency Code – Three-digit agency code number.</li><li>▪ Project Number – Six-digit project identifier assigned to the project in the capital budget.</li><li>▪ Project Title – Title conveying location, project type, and scope – see Office of Financial Management's <i>Capital Budget Instructions</i> (<a href="http://www.ofm.wa.gov/budget/instructions/capinst/05-15capinstr/default.asp">http://www.ofm.wa.gov/budget/instructions/capinst/05-15capinstr/default.asp</a>).</li><li>▪ Agency Contact – Name, address, and phone number of person(s) responsible for preparation of Predesign Study who can answer questions about its contents.</li><li>▪ Mission – Brief mission statement of the agency or institution as it relates to the requested facility.</li></ul>

- Goals – Goals that will be met by this project.
- Administration – Policy, program, and service.
- Facility – Technical and facility needs.
- Existing Facilities – Other existing facilities that will be affected by this project.
- Previous Action Taken – Project planning and request history. Explain if the project is in the current ten-year plan, or if it has been in prior versions.
- Legislative or Executive Intent – Results of previous legislative, executive, or agency action that affects this project.

### **Implementation Approach**

This subsection serves as the organizing framework for future decision making. Discuss the overall direction for further work on the project by:

- Identifying roles and responsibilities for the project.

*Caveat: Be sure a key component of your project predesign team includes people who understand the operating impacts, both from a budget standpoint and from a building operations and maintenance standpoint.*

- Identifying in-house staffing requirements for the proposed project.

#### **Colocation projects should consider:**

- Central source for customer service
- Efficiencies by reducing staff travel time and combining similar activities
- Demonstrate reduction in capital costs
- Reduction in operating costs by sharing costly technical systems and programs

**Project Management**

Identify the preferred management method of design and project delivery method for construction to meet the agency's or institution's project schedule. Costs should be developed to reflect the proposed project management approach. The Predesign Study should address the following issues.

**Management Organization** – Describe the agency's or institution's ability to manage the design and construction of the project. An assessment of the existing resources including the technical capability and experience of staff in reviewing and approving design and construction work should be included. Define the needed FTEs and outline the duties of agency staff and contract consultants. Identify any costs for consultant services or additional staff. Will resources be used from the Department of General Administration?

**Methods of Delivery** – Identify one or more techniques to be used such as design-build, phased construction, general contractor/construction manager (GC/CM), or conventional design/bid/build. Each of these methods has an influence on the quality, cost, and timeliness of providing the required facilities.

**Schedule**

Provide a milestone (for example, a Gantt Chart) schedule for the project, including key dates for budget approval, design, bid, construction, equipment installation, testing, start-up, and full operation. If the facility needs to open by a significant date to meet statutory requirements of population projections, show that on the schedule. Project phases, long lead items, and critical path milestones should be identified. The schedule should reflect the recommended method of contracting.

Include beginning and end dates of all key events of the project and all proposed phases. Highlight the anticipated substantial completion and occupancy dates. Note the midpoint of construction. This date is important because it will be used later for tracking cost inflation and budget impacts of delaying or accelerating a construction proposal. For the purpose of definition, midpoint of construction is the date midway between the commencement date and the date of substantial completion.

Describe any factors that may place the project schedule at risk, such as an environmentally sensitive site location, possible presence of archaeological or historical assets, and/or possible contamination of the site or buildings undergoing renovation. Discuss the permitting climate and whether local government ordinances or neighborhood issues (such as location or parking compatibility) may impact the schedule.

## 2.4 Program Analysis

---

The Program Analysis section identifies the requirements of all spaces to be included in the design of the proposed project alternative. The requirements should not be unnecessarily restrictive in nature but should clearly express the needs of the agency or institution. This section also analyzes all existing program spaces that will have an effect on the proposed project. See Appendix B for additional details about the programming process.

### Assumptions

Describe any assumptions used in defining the program for the proposed alternative. Programs dictate design and decisions made early on ultimately affect costs. For example, a rooftop observatory in a new science building will dictate the location of other programs within the building, the building site to obtain an unobstructed view of the sky, and future development in proximity to the building.

### Existing Facilities Inventory

If existing facilities are affected by the proposed project (demolition, renovation), include the following:

Are current facilities included in State Facility Inventory System (FIS)? Are they accurately coded? What is the current condition as shown on the FIS?

### Space Needs Assessment

Conduct a space needs assessment with the following minimum steps:

- Calculate the project space needs by using currently recognized space planning guidelines, such as the Department of General Administration's [Space Allocation Guidelines](#) or the Facilities Evaluation and Planning Guide for four-year higher education facilities. Identify the guidelines used.

- Compare the space needed to the space currently assigned and space proposed to be retained by the affected programs. Put in table form with explanatory notes as needed.
- Determine the deficits of space for program functions that justify the capital project.
- Determine the impact of the project on the agency's or institution's overall space needs.
- Has the agency discussed space needs with the Department of General Administration?

**Space Requirements**

In developing the space requirements, consider:

- the function of each space included in the program
- the relationships of the functions
- the condition assessment/serviceability of existing spaces
- the efficiencies of the proposed and existing spaces
- special requirements
- voice, data and video communications
- energy management systems and power supplies
- ADA requirements

**Future Requirements**

Describe any future phases or other facilities that will affect this project.

- Codes/Regulations** List all codes and regulations applicable to this project, such as:
- State and local building codes
  - Energy Codes (RCW 39.35)
  - Environmental regulations including Growth Management Act and local, state and federal laws and regulations (e.g., shoreline and wetlands)
  - Sustainability/green building criteria (Chapter 12, Laws of 2005 (ESSB 5509))
  - Local ordinances or special comprehensive plan requirements

## 2.5 Site Analysis

---

**Evaluating Potential Sites** The Site Analysis section evaluates the various factors to be considered in siting the proposed project alternative. It should include a list of potential site locations and identify factors such as, zoning, accessibility, public transportation, geotechnical considerations, etc. See Appendix C for additional details.

**Minimizing Costly Mitigation Requirements** Identify the existing site studies that are available, have already been completed or are underway. Link this information with the history of the site. Identify all potential sites considered for this project and for each site consider:

- Ownership of the site
- Acquisition issues, including timing
- Who are the stakeholders? When will the local jurisdiction be contacted? Are community stakeholder meetings a part of the process?
- Easements - existing and required for new development
- Location, description and dimensions including soil type, climate and topography

- Setback requirements
  - Adjacent facilities and site features
  - What are the issues with the surrounding neighborhood?
  - Utility extension or relocation issues
  - Green space and natural amenities that need to be preserved or accorded special treatment
  - Environmental issues and site mitigation. Is there any history of possible contamination of the site?
  - Wetlands and shoreline impacts. Has a wetlands delineation been conducted? Will existing wetlands need to be filled? How can this be minimized or eliminated? Is the site affected by shoreline jurisdiction?
  - What are the requirements for the State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA)? Is an Environmental Impact Statement required?
  - What are other regulatory requirements, such as hydraulic project approval and Corps of Engineers permits, that need to be met?
  - Parking and access issues. How is the site accessed? What improvements will be required by local ordinances? Are there local road impacts? Can parking demand be reduced to minimize the need for extra parking stalls? How will the site accommodate parking? How does this proposal fit with future development and parking needs?
  - Impact on surroundings and existing development with construction lay down areas and construction phasing
- Are there historical and/or archaeological assets that need to be considered? Review project with the Department of Archeology and Historic Preservation and affected tribes to determine potential impacts to cultural resources.
- Is the site compatible with sustainability and LEED criteria? Can it be made compatible and what are the additional costs?

- Regulatory Factors
  - Zoning Codes
  - Local Requirements
  - Environmental Regulations
  - Building Codes and Requirements
- Energy Conservation

**Acquisition Process**

If the site has already been acquired, describe the site selection process used by the agency or institution.

**Projects without Selected Sites**

For projects without a site, contact the OFM capital budget analyst assigned to your agency to discuss this section. Projects without specific sites should develop a site selection criteria and process. Estimates for site acquisition should be included in the total project costs and be based on justifiable data.

**Preferred Site(s)**

Provide the advantages and disadvantages for each site and discuss the reasons for the preferred site. Provide cost estimate comparisons in the form of life cycle cost analysis of alternatives.

## 2.6 Project Budget Analysis

---

The Project Budget Analysis section contains a narrative of the major assumptions used in preparing the cost estimate, an outline specification of materials and methods, and the completed Predesign Capital Project Request Report Summary Form C-4, Agency/Institution Project Cost Estimate Form C100, and the Benefit and Life Cycle Cost Analysis Summary Form C-3. See Appendices D and E for more details.

The following is a list of items to be included:

- Written outline of major assumptions used in preparing the cost estimate.
- Detailed estimates from consultants and a basic summary of the project based on the major systems or components (Uniformat).

- Predesign Capital Project Request Report Summary C-4 - Appendix F contains a copy of the form or it can be obtained at <http://www.ofm.wa.gov/budget/instructions/predesign/contents.asp>
- Agency/Institution Project Cost Estimate Form C100 – For traditional design/bid/build projects and for alternative public works methods such as Design-Build or GC/CM. See Appendix E for guidelines for preparing capital project cost estimates. Appendix F contains a copy of the form or it can be obtained at <http://www.ofm.wa.gov/budget/instructions/predesign/contents.asp>
- Description of existing program and facilities
- Most appropriate alternative to solve problem and the consequences of not proceeding with the preferred alternative
- Other alternative(s) studied, including economic trade-offs
- Cost benefit analysis/life cycle cost analysis for all viable alternatives and different materials and systems. Form C-3, Benefit and Life Cycle Cost Analysis Summary, is in Appendix F or can be found at <http://www.ofm.wa.gov/budget/instructions/predesign/contents.asp>

### **Relate the Budget to the Scope of Work**

Relate the budget to the proposed scope of work for the project. A scope of work may not be extended for the sole purpose of remedying a deferred maintenance condition. However, funds for the deferred maintenance part of a renovation project may be applied from an agency or institution's infrastructure savings account or omnibus minor works list.

### **Effective Utilization of Space**

Before budgeting for new space, ensure that all existing space is effectively utilized before new space is proposed. This will require an update of the agency's or institution's space inventory. If existing space is available to meet program requirements, renovation or reuse is an alternative approach to satisfy the program requirements. Include a discussion on how space might be backfilled or renovated to reduce overall space needs. Provide justification for not using existing space or space left vacant that might meet the program needs.

**Cost Estimating versus Cost Planning**

**Cost planning is different from cost estimating.** Cost planning occurs before designs have been prepared. It relies on historical or standard industry data to predict the project’s overall costs. It answers the question “Within what range will the project budget fall after the project is fully designed?” Cost estimating measures only the project actually described in drawings and specifications. The predesign is the first step in preparing reasonable and justifiable cost estimates. Identify dollars/square feet and compare to industry standards.

**Projects Outside Cost Control Ranges**

**For projects outside a recognized cost control range (see Appendix E), additional information is required to explain why the range is inappropriate or too general for the proposed facility.** Contact the OFM capital budget analyst to discuss a project encountering this situation.

**Funding Sources**



- Identify the fund sources and proposed funding sequence for construction (i.e., federal funds and private donations).
- Will alternative financing will be considered? If so, provide a comprehensive financing plan that documents the flow of revenues and expenditures for all fund sources and demonstrates that sufficient fund balance exists in the dedicated accounts used for payment of any debt service.
- If the proposed project will bring in revenues, provide a business plan that details the strategies and assumptions for revenue generation.

**2.7 Master Plan and Policy Coordination**



The Master Plan and Policy Coordination section details the relationship of the proposed project to any applicable agency or institution or controlling plan (e.g., Thurston County or Capitol Campus Master Plans or agency Master Plan). Identify the date of the controlling plan. Proposed changes to the master plan as a result of the Predesign Study should be discussed in this section along with a proposed schedule for adoption.

Agencies or institutions lacking well-developed strategic objectives or a capital master plan should start with their mission or scope statement as the source document for determining these objectives. This is especially important for agencies without capital master plans.

**Thurston County Master Plans**

If applicable, describe how the proposed project does or does not conform to the master or subcampus plans for the state capitol, including any revisions.

**Other Significant State Requirements**

Describe how the proposed project adheres to requirements such as:

- Chapter 12, Laws of 2005 (ESSB 5509) requiring all state-funded buildings over 5,000 square feet to be designed, constructed, and certified to at least a LEED silver standard,
- the Growth Management Act of 1990,
- revisions to the state's policy on indoor air quality, and
- the Clean Air Act of 1991.

---

## 2.8 Facility Operations and Maintenance Requirements

The Facility Operations and Maintenance Requirements section defines the impact of the proposed project on the operating budget for the agency or institution. Items such as staffing, operations, and maintenance of the facility’s mechanical and electrical systems, utilities, and internal rents should be discussed in this section.

**Operating Budget Impacts**

**Show operating costs over five biennia in a table format.**

Estimate the project’s effects on operating budgets including staffing levels and corresponding salaries, building repair, replacement, and maintenance.

- What are the operating budget impacts during the project? Provide a staffing plan that includes in-house staffing (both operating and capital) requirements (FTEs) for the project.
- What are the operating budget impacts when the project is completed? Identify projected increases or decreases in operational costs. Operational costs should be detailed in a table showing existing operational costs, projected new costs, and the net differences.

- How will additional operational costs be funded after the project is complete?

## 2.9 Project Drawings and Diagrams



The Project Drawings/Diagrams section contains conceptual (pre-schematic) drawings of the proposed capital construction project in enough detail to describe the project. Site diagrams illustrating various alternative sites and site layouts should also be provided. **Drawings/diagrams should be conceptual or pre-schematic only. Schematic level documents are neither desirable nor required for predesign.**

### Site Plans

Diagram the spatial needs of the project requirements including building footprint, massing, elevations, parking, access, circulation and open spaces, and any special constraints and requirements (e.g., highway turnoffs, pedestrian bridges, and relationships to other buildings).

### Building Plans

Provide generalized spaces representing program elements organized in realistic relationships (conceptual drawings).

### Building Volumes

Provide generalized block diagrams representing building massing and configuration as it relates to the site and surrounding structures.

## 2.10 Appendix



At a minimum, the appendix should include the predesign checklist. Agencies also may include additional supporting information in the appendix, including but not limited to:

- The agency strategic plan, relevant excerpts or site maps from agency master plan or local jurisdiction comprehensive plans
- Agency performance standards for the project
- Details on programs, divisions or units



## Predesign Checklist

---

### PREDESIGN CHECKLIST



The predesign checklist should be completed by the agency and submitted to the Office of Financial Management with the predesign.

Is the following in the predesign? If not, it should be noted “not applicable”

- Executive Summary
- Project Analysis
  - Discussion of operational needs
  - Discussion of alternatives
  - Discussion of selected alternative
  - Identification of issues
  - Prior planning and history
  - Stakeholders
  - Implementation approach
  - Project management
  - Schedule
- Program Analysis
  - Assumptions
  - Functions and FTEs
  - Spatial relationships between the facility and site
  - Interrelationships and adjacencies of functions
  - Major equipment
  - Special systems such as environmental, information technology, etc.
  - Future needs and flexibility
  - Sustainability and energy utilization
  - Applicable codes and regulations
- Site Analysis
  - Potential sites
  - Building footprint
  - Site considerations such as physical, regulatory, and access issues
  - Acquisition process
- Project Budget Analysis
  - Assumptions
  - Detailed estimates

- Funding sources
- Form C-4, Predesign Capital Project Request Report Summary
- Form C100, Agency/Institution Project Cost Estimate
- Form C-3, Benefit and Life Cycle Cost Analysis Summary
- Sign off by agency
  
- ☐ Master Plan and Policy Coordination
  - Impacts to existing plans
  - Adherence to significant state policies
  
- ☐ Facility Operations and Maintenance Requirements
  - Assumptions
  - Operating costs in table form
  - Staffing plan (capital and operating)
  
- ☐ Project Drawings/Diagrams
  - Site plans
  - Building plans
  - Building volumes
  - Elevations
  
- ☐ Appendix
  - Predesign checklist
  - Project budget unit cost detail
  - Sustainable design charette summary
  - Additional information as needed



## Program Analysis Section Detail

---

**T**HIS SECTION includes the program requirements to be considered in the design of the facility. The requirements should be compatible with the expected use of the facility and conform to all codes and regulations. A predesign program addresses both the agency;s or institution’s wants, needs, and interests for the project as well as the design parameters, constraints, and requirements of interest to the designer. These documents are the primary vehicle of communication between the agency or institution and the design team at the onset of the design effort.

The process of programming is valuable to both owners and designers as a systematic and analytical process and as a decision-making tool. This is accomplished by thoroughly examining the facts and factors that influence design solutions, and by reducing financial risk.

The program documents should conform with and enhance the previously prepared master plan (if applicable) and statement of purposes and goals. The program is a statement of requirements to be considered in the design of the facility. The requirements should not be unnecessarily restrictive in nature, but should clearly express the needs of the agency or institution.

Program documents should describe the following:

- The functions that will be housed in the proposed facility;
- The number, grouping, and nature of the people involved, including staff and support personnel, expressed as FTEs;
- The spatial relationship between the facility and the site;
- The interrelationship of the various functions to be housed in the facility;
- The major items of furniture and equipment to be used in the facility;
- Any special environmental provisions which are required in the facility;
- Future needs and flexibility requirements;
- Special systems such as voice, data, and video communications or utility needed; and
- Energy utilization and sustainability (green building) of the facility.

Program documents vary in levels of detail. The type of document most suitable for the predesign phase is a comprehensive discussion of all issues that can be identified.

## B1 The Programming Process

---

While there are many ways to structure the programming process, it generally involves five steps:

- Data collection;
- Data analysis;
- Data organization and development of concepts;
- Communication of data and concepts; and
- Evaluation of the resulting program.

### B 1.1 Sources of Information

The first task is to collect the information – facts, opinions, projections, and speculations – needed to develop the performance criteria. There are four important sources: the owner, the users, external requirements and standards, and the programmer's own experience.

- **The Owner** – The program must reflect the owner's needs and aspirations, goals, organization, and procedures.
- **Users** – In some projects, the owner is not the project's ultimate user. In these situations, it is important that the programmer understands that the needs and aspirations of the owner and users may be quite different and that both must be recognized in the design.
- **External Requirements and Standards** – Planning and zoning ordinances, building codes, the state's energy conservation and green building policies in designing public facilities, and other regulations all affect facility requirements. At the same time, planning and design standards (such as floor area requirements for auditorium seating, viewing standards for projected media, utility requirements for laboratories, and toilet requirements for handicapped accessibility) will establish certain program requirements. Parking standards and agency commute trip reduction standards can also greatly affect building configurations.
- **Programmer's Experience** – The programmer's experience with the facility type, the owner type, or the situation faced by the owner can be invaluable in presenting options beyond the owner's familiarity. Experienced programmers understand that guidance to owners is central to effective programming and will provide this guidance during the process.

## B2 Programming Standards

---

The state of Washington has established standards for the allocation of space for various building types: state office buildings, higher education facilities, and military facilities.

## B 2.1 State Office Buildings

The Space Allocation Standards, prepared by the Department of General Administration, contains standards and instructions to agencies for state-owned and leased office space. Agencies preparing predesign documents for office buildings are required to follow these standards or provide justification for deviation. The state has established four basic goals for space allocations:

- Space allocations should be based on functional programming which will be completed before the acquisition of space.
- The state supports the use of the open landscape concept and will strive for a ratio of 90 percent of the personnel in open landscape and 10 percent in private offices.
- It is the responsibility of the occupying agency to provide furniture for leased and owned facilities. The state's goal is to use systems furniture where feasible to ensure the most efficient and effective use of space. Variances to systems furniture may be appropriate if justified due to functional requirements of the tenants.
- A space planning layout efficiency factor of 80 percent or greater is the goal for the allocation of assignable square feet.

Spaces in existing facilities that are being renovated may not conform to the space standards since efficiency in the design of spaces may be restricted by existing structural elements. However, every effort should be made to conform to these standards which can be found at <http://www.ga.wa.gov/RES/form.htm>

## B 2.2 Higher Education Facilities

For higher education (four-year) facilities, the Interinstitutional Committee of Space Officers developed the Facilities Evaluation and Planning Guide (FEPG) as a model for use by four-year colleges and universities in preparation of capital requests. The guide addresses two elements of the programming process for higher education facilities:

- Evaluation of current capacity of physical facilities; and
- Projection of long-range facilities needs.

The guide can be obtained at or by contacting the Higher Education Coordinating Board at (360) 753-7800. An alternative to the FEPG space and programming standards may be used and should be clearly identified. An example of an acceptable alternative standard would be in the case of a multi-institutional project.

## B 2.3 Military Facilities

Military facilities must be in compliance with the Department of Defense regulations for the planning, programming, and budgeting of Army and Air National Guard facilities.

## B 2.4 Programming Techniques

A number of techniques can be used in data collection, analysis, organization, communication, and evaluation. Some are rudimentary; others are more sophisticated than may be required by the project. The preferred technique depends on the project complexity and the experience of the consultant.

## B 2.5 Securing Commitment

Effective programming is far more than a mechanical process; it includes securing owner and user commitment to the resulting programming requirements. It is one thing to hold meetings, do interviews, research codes and standards, and write and communicate a proposal. It is a much more difficult task to get the stakeholders to participate and support a project, especially if they are not involved in furnishing data or participating in development of criteria.

As always, the key to commitment is early and ongoing involvement. The programming process should involve all the key participants, including those who are responsible as the project moves forward for construction and those who must supply approvals. Meetings should be structured to allow ample time for discussion and consensus. The programming process should be carefully documented with progressive commitment to results as it proceeds.

## B 2.6 Programming and Budgeting

The program describes the scope (how much of what) and quality (the level of performance and amenity) to be accommodated. Scope and quality, as well as the site and the schedule, are key factors in establishing cost. Programming and budgeting should be seen as both simultaneous and reciprocal.

## B3 Step-by-Step Programming Tasks

---

The following is an example of how the typical programming process works:

**B3.1 Identify the basic elements** and set up a structure for collecting information and making decisions.

- Set up the structure and techniques to obtain necessary information from owners, managers, community groups, and users – any persons with necessary knowledge or significant influence;
- Interview the key decision makers and users;
- Prepare an outline of the program;
- Organize the material into small parts related to the owner's interests and to the ways in which the designer will proceed; and
- Key all information to the outline.

**B3.2 Document and evaluate** the present building condition (if one exists), how much space is used by each entity/employee, what works well, and what does not.

- Inventory all spaces in drawings and text format;
- Inventory all furnishings and equipment that are used or will be needed;
- Have occupants and decision makers evaluate the present spaces; and
- For renovation projects, have occupants and decision makers participate in identifying areas and features to retain or to change.

**B3.3 Prepare a space requirements outline** (Outline Program).

- Use an acceptable standard format;
- Include basic spatial criteria such as dimensions, proportions, and volumes;
- Include services and storage requirements, access, flexibility, and utility requirements for each space; and
- Reference more detailed requirements (state standards).

**B3.4 Describe overall building requirements** with respect to use, purpose, and general requirements.

- List the range of users and uses, such as parking, access, security, degree of public access or privacy for various components as well as symbolic and aesthetic requirements; and
- Revise the Outline Program as required.

**B3.5 Describe the role** of the project in the surrounding landscape or community.

- Include zoning and environmental impacts;
- Include symbolic and aesthetic goals;
- Consider pedestrian and vehicular access to the site; and
- Identify neighborhood and growth management impacts and concerns.

**B3.6 Define the fundamental functional, spatial, and visual relationships** among components of the project.

- Include relationships between components or departments;
- Include relationships between the building components and the outside community or visitors;
- Describe any grouping requirements, such as for security, public access, or super-cleanliness (e.g., clean room labs); and
- Use diagrams, sketches, or other methods that suggest scale and relationships.

**B3.7 Identify measures** to allow for future growth and change.

- Identify elements subject to change, both in the short and long term. Assess probabilities of change and indicate where expansion, contraction, or alteration should be provided in design;
- Note technology and space needs that may change (e.g., mechanical and electrical systems, labs, computers); and
- Identify energy and utility systems that allow for efficient expansion.

**B3.8 Summarize key requirements** of governing codes and regulations.

- Identify and list applicable codes and regulations; and
- Cover major program requirements or constraints.

**B3.9 Define energy, environmental, and sustainability requirements.**

- Define the LEED criteria to obtain at least the LEED silver standard as required by Chapter 12, Laws of 2005 (ESSB 5509) for any buildings over 5,000 square feet. Conduct eco-charrettes to incorporate green building concepts into the project.
- Indicate energy conservation or environmental protection measures to be pursued in design (beyond those required by code - RCW 39.35);
- Include climate and microclimate information;
- Determine whether the designer will be able to propose additions to the budget based on life-cycle cost analysis. Identify the owner's decision criteria (time frames for analysis, discount rate, etc.);
- Identify available utility assistance programs for designing and constructing an energy efficient facility (Energy Partnership).

**B3.10 Develop a detailed room or space program.**

- Area and configuration requirements;
- Physical access (ADA) and adjacency requirements;
- Loading and special structural requirements;
- Lighting and acoustic requirements;
- Security and safety requirements;
- Mechanical, electrical, and service requirements;
- Aesthetic requirements; and
- Special requirements.

**B3.11 Prepare a summary program.**

- Summarize program requirements;
- Include schedule and budget requirements; and
- Indicate how the program will be approved, revised, and updated.

**B3.12 Present the program.**

- Complete all the sections of the predesign as outlined in the Predesign Manual;
- Ensure that computer systems used for collecting, analyzing, and storing data are compatible with the owners' systems;
- Organize documentation into relatively small distinct packages so parts may be updated without revising the whole; and
- Gear presentation content and media to audience and purpose.





## APPENDIX C

# Site Analysis Section Detail

**S**ITE ANALYSIS is a vital step in the project design process. It consists of evaluating an existing or potential site as it relates to the program, budget, and schedule for the entire project.

Finding suitable sites with the confidence that all relevant acquisition, governmental, environmental, and engineering issues have been explored is a challenge. Occasionally, utility serviced sites can be found that are free of environmental constraints, free of easements, are reasonably priced, and have good access. Generally, however, site selection is very dynamic and full of variables.

A site analysis during a Predesign Study provides direction for design and site selection based on program requirements as well as sensitive use of the land.

## C1 Identify Potential Sites

---

Several tools are available to assist in site selection. These tools include: review of topographic information, zoning restrictions, tax assessments, road maps, and aerial photographs; discussions with major landholders, local planning officials, commercial concerns, and developers of other facilities; drive-by inspections; consultation with realtors; archaeological assessments; and environmental assessments.

Only the most promising sites require further evaluation as part of the Predesign Study. Written descriptions of the existing conditions as well as drawings should be prepared to fully describe the site. There may be more than one site that requires limited technical evaluation.

## C2 The Site Programming Process

---

Site analysis evaluates a program (see Appendix B) and site together in order to determine their compatibility. The determination of the spatial needs of the program requires an analysis of the following program elements:

- **Building Footprint** – The site coverage for a building – its “footprint” – depends on the following:
  1. The total gross area of the building – see Program Analysis section.
  2. The number of floors – based on programmatic requirements, site area, and zoning requirements.
  3. The configuration of the building.

- **Parking Requirements** – Often the biggest site requirement in many programs is the area necessary for parking. This requirement may be a function of the program, or it may be set by zoning ordinances or other local regulations establishing parking ratios for different land uses.
- **Circulation and Open Space Requirements** – The areas for pedestrian and vehicular circulation, access, and common open space are also major components of the program. The portion of the site allocated to circulation and open space will depend on land values, site configuration, and design objectives.
- **Special Constraints and Requirements** – Special site issues may take the form of utility easements, set backs, right-of-way, retention ponds, recreation areas, vista and sight line requirements, as well as flood-plain areas and ecological preserves.

### C3 Site Evaluation

---

If multiple sites for a particular project are being evaluated, detailed technical and comparative analysis of the sites may be required to determine total site development costs. These costs often have a significant impact on the decision to select one site over another.

The following issues need to be considered when evaluating potential sites:

#### C3.1 Physical Issues

- **Climate** – Identify major climate factors such as wind direction, solar orientation, temperature, humidity, and precipitation.
- **Topography** – Identify documentation that categorizes the topography and soils in the locations of each site. Use existing documentation to determine the estimated risk of construction on these sites. In some cases, limited geotechnical services are also appropriate.
- **Limited Geotechnical Work** – Perform limited geotechnical investigation of candidate sites that have questionable soil characteristics. Make a preliminary determination of the bearing capacity of the soil, site stability, and review other natural features such as surface or groundwater characteristics.
- **Utilities** – Determine availability of domestic water, its sources, and whether water rights are needed. Determine availability of sewer, gas, power, telephone, and any other utilities required by the project.
- **Identify Environmentally Sensitive Conditions** – Review the sites to determine sensitive environmental characteristics, such as steep slopes, unstable soils, flood plains, bogs, creeks, wetlands, habitat, and certain wildlife which may limit the development of the site.
- **Archaeological Assessment** – Determine if an assessment has been or needs to be conducted.

- **Conduct Hazardous Materials Inventory** – Review property title and site records for history of underground or surface storage of hazardous materials. Also, review regulatory agency documentation including those from the Environmental Protection Agency, Washington State Department of Ecology, county and local fire departments, power companies for listings and permit applications, solid waste permits, reporting of hazardous substance spillage, and registrations of underground storage tanks.

If toxic wastes exist, determine the magnitude and type of contamination and propose a feasible method of disposal.

### C3.2 Regulatory Issues

- **Review Zoning Requirements** – Review with the county or city the general plan and zoning classification for each of the candidate sites and identify any inconsistencies with current zoning.
- **Review Local Requirements** – Review with county, city, or appropriate government agency any local requirements such as design review, land use permits, etc.
- **Building Codes and Requirements** – Analyze all applicable building codes that may have adverse cost impacts or cause delays in the permit process during design and construction.
- **Parking** – Review requirements for parking on the site. Evaluate surface versus garage parking options for each site.

### C3.3 Access Issues

- **Site Accessibility** – Determine the probable impact of the project on traffic flows and identify required improvements. With the assistance of the appropriate agencies, review available traffic information regarding volumes, existing road system, future plans for road improvements, and discuss possible enhancements that may be required. Determine potential auto and bus routes and other pertinent information. Conceptually analyze site access routes for buses, autos, and pedestrians. Identify right-of-ways or additional land that may be required to provide access to the site.
- **Utilities** – Research connection requirements of all utilities and identify connection requirements and costs. Utilities include water, gas, telephone, electricity, and cable service.
- **ADA Access** – Identify how this project fits into the overall objectives of the agency for program accessibility required by the Americans with Disabilities Act (ADA). Identify spaces in existing structures that should be remodeled to improve program access under ADA laws. Identify any special access requirements of clients and employees that may require accommodation exceeding code requirements. In addition, evaluate the placement, alignment, and elevation of the

facility as they relate to access and parking areas.

## **C4 Scheduling and Budgeting**

---

In developing a budget and a schedule for the project, the following questions should be addressed:

- Is the site under the agency/institution's control and, if not, when will it be?
- If the agency/institution has an option on the site, how long will it be in force? Can it be renewed?
- Are there easements or other restrictions (highway, railroad, utility, etc.) on the full use of the site? How long will it take to resolve them?
- What regulatory approvals are required before construction can begin? Who grants approvals and what information is required? How much will approvals cost? How long will it take to prepare the necessary materials, and how long will the review process take?
- What can be said about the community acceptance in which the project will be reviewed and approved? Will the project be controversial?
- Are there other funding cycles (federal funding) that may affect the schedule?

Once the site analysis is complete, conceptual drawings and diagrams are prepared to determine usability of sites, points of vehicular access, easements, topography, and existing structures that will impact the project. Conceptual cost estimates should be developed for each site under consideration (see Project Budget Analysis Section 2.6). Both on and off-site development costs should be escalated to the time of probable construction.

The Predesign Study must explain whether the preferred site conforms to the State Capitol Master Plans or similar long-range facilities plans encompassing the selected site. Also, explain how the site promotes regional transportation policies as required by the Growth Management Act of 1990.

On the basis of the above information, the Predesign Study should include a recommendation for the best site for the project.



## Project Budget Analysis Section Detail

---

### D1 The Project Budget

---

The most important cost estimate given during the course of a project's life is the first one – this is the number everyone remembers. Project budgets are very difficult to establish during the predesign phase because the definitive design is not yet final. However, a realistic budget can be developed to reflect the following:

- **Project Scope** – The gross built area and volume, together with occupancy type and number of occupants in the building, set the stage for construction cost. This requires accurate identification of the functional space requirements of the agency or institution (see Appendix B).
- **Site** – Identify the costs of developing the site and accommodating the building to it (see Appendix C).
- **Schedule** – It is necessary to establish an accurate project timeline in concert with legislative funding schedules. The schedule may impact costs due to inflation factors and market conditions. Use standard escalation factors provided by the Office of Financial Management (OFM).
- **Quality and Performance Levels** – Building and systems quality levels must be established in order to achieve an adequate budget.

The construction budget sets the stage for project design and is the framework within which all design decisions will be made. The predesign budget is an estimate based on the best information known at the time – it is not a guarantee of funding or final costs.

### D2 Cost Estimating Formats

---

To achieve consistency in evaluating agency or institution requests, a standardized format of cost reporting has been developed by OFM. Decisions affecting project costs are made throughout the budgeting, predesign, and design processes using the following methods.

#### D2.1 Unit Costs

During the initial budgeting phase, construction budget estimates may be prepared using single-unit costs based on broad-accommodation parameters, for example: cost per student, cost per bed, cost per square foot of gross floor area or cubic foot of building volume. Any of these or similar measures may effectively generate an approximate project construction cost. Efficiency

ratios and conversion factors for transforming net-to-gross floor areas, together with the cost per square foot of net usable area, may be useful in preparing estimates.

This information can then be tested in the predesign phase using costs per square foot of functional activities programmed for each space; for example, cost per square foot of wet laboratories versus that for offices and clerical spaces. Costs also vary based on basic criteria and design parameters of the building systems and components to be selected. Square foot building estimates are used at the budgeting phase only. As more information becomes available during predesign, schematic, design development, and construction document phases, cost estimates become more detailed.

## D2.2 Unit Format

In the predesign phase, it is normal to use cost information based on the elements of each building subsystem to prepare the estimates. This method of system estimating is called the "Uniformat" system or Uniform Building Component Format. Figure C-1 illustrates the cost control and estimating system based on Uniformat down to Level 3. Level 2 cost estimating is required of all predesign document estimates. As the project moves forward into design, further detail based on the Uniformat structure should be used. For example, a Level 4 estimate should be prepared prior to bidding the project.

The Uniformat system allocates funds to the various functional areas of a facility and allows the designer to make early cost comparisons among alternatives. When life-cycle data is provided, a total cost analysis is possible.

**Figure D-1**  
**Uniformat Coding Structure**

LEVEL 1	LEVEL 2	LEVEL 3		
A Substructures	A10 Foundations	A1010	Standard Foundations	
		A1020	Special Foundations	
		A1030	Slab on Grade	
	A20 Basements	A2010	Basement Excavation	
		A2020	Basement Walls	
B Shell	B10 Superstructure	B1010	Floors	
		B1020	Roof Construction	
	B20 Exterior Enclosure	B2010	Exterior Walls	
		B2020	Exterior Windows	
		B2030	Exterior Doors	
		B30 Roofing	B3010	Roof Coverings
	C Interiors	C10 Interior Construction	C1010	Partitions
C1020			Interior Doors	
C1030			Fittings	
C20 Stairs		C2010	Stair Construction	
		C2020	Stair Finishes	
C30 Interior Finishes		C3010	Wall Finishes	
		C3020	Floor Finishes	
		C3030	Ceiling Finishes	

LEVEL 1	LEVEL 2	LEVEL 3		
D Services	D10 Conveying Systems	D1010	Elevators and Lifts	
		D1020	Escalators and Moving Walks	
		D1030	Other Conveying Systems	
	D20 Plumbing	D2010	Plumbing Fixtures	
		D2020	Domestic Water Distribution	
		D2030	Sanitary Waste	
		D2040	Rainwater Drainage	
		D2090	Other Plumbing Systems	
		D30 HVAC Systems	D3010	Energy Supply
			D3020	Heat Generation
	D3030		Refrigeration	
	D3040		HVAC Distribution	
	D3050		Terminal and Packaged Units	
	D3060		HVAC Instrumentation and Controls	
	D3070		Testing, Adjusting, and Balancing	
	D3090		Other Special HVAC Systems and Equipment	
	D40 Fire Protection		D4010	Sprinklers
			D4020	Standpipe
		D4030	Fire Protection Specialties	
		D4090	Other Special Fire Protection systems	
D50 Electrical Systems		D5010	Service and Distribution	
	D5020	Lighting and Branch Wiring		
	D5030	Communication and Security		
	D5090	Other Electrical Systems		
	E Equipment & Furnishings	E10 Equipment	E1010	Commercial Equipment
E1020			Institutional Equipment	
E1030			Vehicular Equipment	
E1090			Other Equipment	
E20 Furnishings			E2010	Fixed Furnishings
		E2020	Movable Furnishings	
F Special Construction and Demolition	F10 Special Construction	F1010	Special Structures	
		F1020	Integrated Construction	
		F1030	Special Construction	
		F1040	Special Facilities	
		F1050	Special Controls and Instrumentation	
	F20 Selective Building Demolition	F2010	Building Elements Demolition	
		F2020	Hazardous Components Abatement	

LEVEL 1	LEVEL 2	LEVEL 3
G Sitework	G10 Site Preparation	G1010 Site Clearing
		G1020 Site Demolition and Relocation
		G1030 Earthwork
		G1040 Hazardous Earth Remediation
	G20 Site Improvements	G2010 Roads
		G2020 Parking Lots
		G2030 Pedestrian Paving
		G2040 Site Development
		G2050 Landscaping
		G30 Civil and Mechanical Utilities
	G50 Electrical Utilities	G3020 Sanitary Sewer
		G3030 Storm Sewer
		G3040 Heating Distribution
		G3050 Cooling Distribution
		G3060 Fuel Distribution
		G3090 Other Site Mechanical Utilities
		G4010 Electrical Distribution
	G60 Other Site Construction	G4020 Site Lighting
		G4030 Site Communication and Security
		G4090 Other Site Electrical Utilities
G6010 Service Tunnels		
G6020 Other Site Systems		
Z General	Z10 General Requirements	Z1010 Administration
		Z1020 Quality Requirements
		Z1030 Temporary Facilities
		Z1040 Project Closeout
		Z1050 Permit, Insurance and Bonds
	Z20 Contingencies	Z2010 Design Contingencies
		Z2020 Escalation
		Z2030 Construction Contingencies

### D2.3 Agency/Institution Project Request – Form C100

For the Predesign Study, Form C100 is used for traditional design-bid-build projects and alternative public works methods. This form assists in developing and illustrating costs at different stages in project development. The use of this form allows projects to be compared uniformly and consistently. The form also facilitates communications among all members of the project team, the agency or institution, OFM, and the Legislature, and allows study teams (value engineering, designers, consultants and reviewers) to quickly identify and focus on the various cost areas and provide a basis for estimating life-cycle costs.

To achieve consistency, the information required on the C100 is divided into seven standard categories:

1. Acquisition
2. Consultant Services
3. Construction Contracts

4. Equipment
5. Artwork
6. Other Costs
7. Project Management

Agencies/institutions should also include a written outline of all cost assumptions and an outline specifically describing the building systems used in preparing the costs.

Appendix E contains brief instructions for completing the C100, and Appendix F contains a copy of the form. The form can also be found at <http://www.ofm.wa.gov/budget/instructions/predesign/contents.asp>.

### **D3 Life Cycle Cost Analysis and Cost Benefit Analysis**

---

Life Cycle Costing (LCC) is the process of making an economic assessment of an item, area, system, or facility by considering significant costs of ownership over an economic life, expressed in terms of equivalent costs. The essence of LCC is the analysis of equivalent costs over the design life of each alternative discussed in the Predesign Study. To ensure that costs are compared on an equivalent basis, the baseline used for initial costs must be the same as that used for all other costs associated with each alternative under study, including maintenance and operating costs. LCC techniques should be used when undertaking a cost benefit analysis. The lack of such formal procedures can lead to poor decisions or choices.

#### **D3.1 Terminology and Examples**

- **Methods** – To compare design alternatives, both present and future costs for each alternative must be brought to a common point in time. One of two methods can be used. Costs may be converted to today's dollar value by the "present worth" method, or they may be converted to an annual series of payments by the "annualized method."

The present worth method requires conversion of all present and future expenditures to a baseline of today's cost. Initial (present) costs are automatically expressed in present worth. The annualized method converts initial, recurring, and non-recurring cost to an annual series of payments. This method may be used to express all LCC as an annual expenditure.

Both the present worth method and the annualized method will result in the same economic recommendations. Because the present worth method allows easier consideration of differential escalation, it is the more common approach and is recommended for use during the Predesign phase.

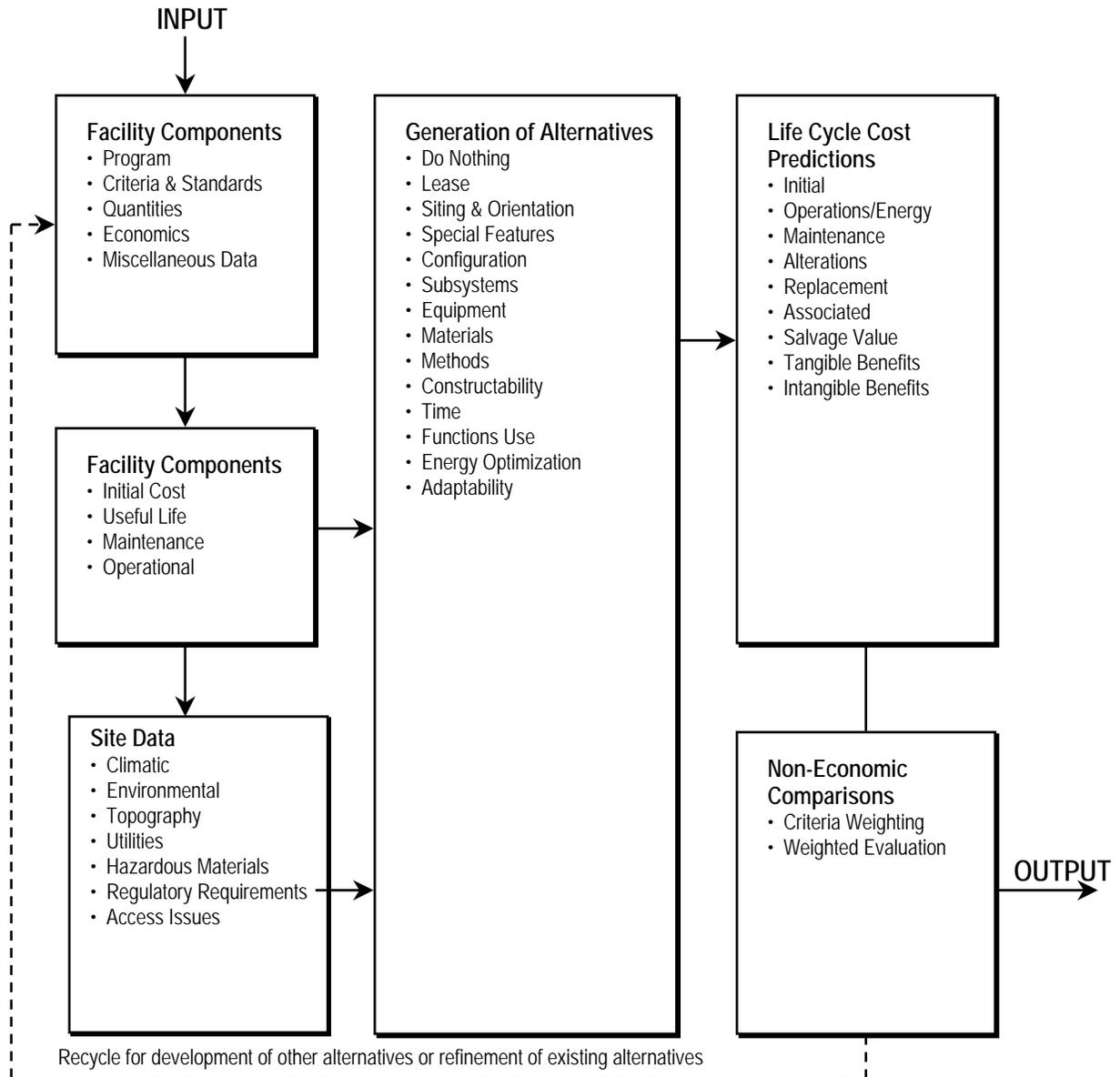
- **Discount or Interest Rate** – Calculation of present worth is often referred to as discounting. Any reference to the discount rate means either the minimum

acceptable rate of return for the owner for investment purposes or the current prime or borrowing rate of interest. Whichever rate is used in the calculations, it must be clearly identified and consistent for each alternative studied.

- **Escalation** – Escalation has a significant impact on LCC and is accommodated in LCC by expressing all costs in terms of constant dollars. For example, if the LCC is being conducted in 1998 dollars, then the purchasing power of a 1998 dollar should be used throughout the analysis. When the comparative analysis includes items with equal escalation rates, the effect of escalation will be canceled out.
- **Salvage (Residual) Value** – When evaluating alternatives with unequal useful lives during the economic life cycle period, a salvage or residual value must be established. The salvage value is the estimated value (constant baseline currency) of the system or component at the end of the economic life cycle or study period. The value of a system at the end of its useful life is normally equal to its salvage value less the cost incurred for its removal or disposal.

### D3.2 Life Cycle Cost Methodology

The following illustrates a flow chart for applying LCC to a project:



The first requirement is input data. With this data, alternatives can be generated, followed by LCC predictions. From these predictions, a non-economic comparison is made to evaluate the assumptions about component costs balanced with the functional, technological, and aesthetic factors of the project. The resultant weighted choice is proposed as the optimum alternative. This is the best alternative representing the best choice balancing costs and non-economic criteria. Of the input data required, specific project information and site data are usually available (see Appendix B - Program Analysis and Appendix C – Site Analysis), but it is unusual

for facility components data to be available, especially information regarding useful life, maintenance, and operations. Although such input is needed to calculate roughly 25 percent of total costs, few analysts have access to comprehensive data in a format facilitating LCC analysis. Currently, there is no system retrieval format for LCC data readily available. However, several published documents are available that provide this data.

#### **D2.4 LCC Formats**

The format for preparing LCC analysis is included in Appendix E – Forms (also at <http://www.ofm.wa.gov/budget/instructions/predesign/contents.asp>). Although forms are available that compare specific facility components such as the type of exterior siding, this manual only includes information for preparing an analysis of complete facility alternatives – the purpose of predesign.



## APPENDIX E

# Guidelines for Preparing Capital Project Cost Estimates (Form C100)

---

The Capital Project Cost Estimate Form (Form C100) is a tool to assist agencies and institutions in creating a project construction budget. It can also be an analytical tool to help agency and institution management, as well as executive and legislative decision-makers, understand the costs and many other parameters associated with the project. And, in a similar manner, it can measure capital construction performance at both the agency/institution level and in a statewide perspective. The C100 is NOT an accounting tool; it does not create lines of cost codes and associated funds for payment of the various budgeted items.

Cost planning is different from cost estimating. Cost planning occurs before design begins and relies on historical or standard industry data to predict the project's probable cost. It answers the question, "Within what range will the project budget fall after the project is fully designed?" On the other hand, cost estimating refines the probable project cost from drawings and specifications. The C100 is a cost estimating activity that is created through more defined project information.

The C100 provides both a detailed and summarized cost estimate for capital projects and identifies the principal assumptions used for cost estimates. Every project is unique; consequently, the list of cost items on the C100 is not inclusive. Cost items other than those listed on the C100 can be included, if known, or subsequently identified as more information about the project becomes available. Costs specific to each project must be developed based on the need for that project.

The C100 form and model shall be the one provided and maintained by the Office of Financial Management (OFM). Use of any other form or model will result in automatic rejection of the Predesign submittal by OFM.

## General Administration Supplemental Guidelines

---

In order to assist client agencies in developing capital budgets, the Department of General Administration Division of Engineering and Architectural Services (E&AS) has prepared a supplement of suggested guidelines to the Capital Project Cost Estimate Instructions. For a copy of the supplement, contact E&AS at (360) 902-7272 or <http://www.ga.wa.gov/eas/EA-References/SupInst.doc>.

### Sources of Cost Estimates

---

Cost estimates originate from the agency's technical staff, outside consultants, or the Division of Engineering and Architectural Services (E&AS) within the Department of General Administration. Cost information may be derived from historical information from the agency or E&AS on projects similar to that being considered or from unit-cost/square-foot-cost information from industry standard estimating guides (such as R.S. Means, Dodge, or other national standards). Quantity takeoff estimates may be based on specifically determined project components and design configurations (e.g., as shown in architectural drawings and specifications).

Cost estimates are refined as more project specific information becomes known from predesign or design activities. Refined cost estimates should include the following:

- **More Specific Determinations of Project Size, Complexity, and Quality.** As more detailed quantity takeoff estimation becomes available, cost estimates should be prepared using this technique as much as possible. Even if unit-cost figures must still be used, they should be broken down into the smallest reasonable cost categories. Ultimately, detailed construction cost estimates can be prepared from the final design documents.
- **Further Identification of the Attendant Costs of the Construction Program.** Evaluate the inclusion of items such as those shown in the Capital Project Cost Estimate. Denote and provide costs for items discovered that are not shown on the form. Many such issues do not become apparent until predesign and preliminary design activities are conducted.

### Design and Consulting Services Costs

---

Basic design services costs are automatically calculated on the C100. These fees are computed from an OFM derived fee schedule multiplier on the maximum allowable construction cost for the project. The fee schedule considers the building type, complexity and estimated construction cost. Basic design services do not necessarily include all of the design disciplines or activities required for a particular project. Additional design services that are frequently required for many public works projects are listed on the C100. Guidelines for Determining Architect/Engineer Fees for Public Works Building Projects can be found in the 2005-15 Capital Budget Instructions or at <http://www.ofm.wa.gov/budget/instructions/capital.asp>.

## Base Month Cost Adjustments

---

The cost adjustment factors provide escalation multipliers that are applied to the aggregate cost categories indicated on the cost estimate summary section of the C100. Escalation factors are determined by OFM and are automatically calculated on the various elements of the cost estimate based on the inflation rate applied to the estimated time from the base month and the design or construction event.

## Project Schedule Estimates

---

The Project Schedule by Phase/Activity chart below provides a historically based estimate of the duration of various activities of the design and construction, expressed as a function of project value. Other scheduling considerations also are identified. In addition, the overall schedule must account for the anticipated budget approval cycle, funding cycles, and other activity cycles particular to each agency. The planning cycle itself impacts the project development schedule.

The project scheduling process requires careful and detailed planning. Consider not only the desired start/finish dates, but also the intermediate milestones that are to be achieved. Evaluate the schedule requirements both for activities occurring before the milestones. Creating even the most preliminary project schedule will involve at least two points in time: project start and project completion. Depending on the specific situation, milestones may be established by choice or predetermined by external constraints such as weather considerations.

Actual project durations depend on the adequacy of programming and planning, complexity of the design, use of concurrent activity, streamlining of the agency approval process, and the regulatory environment.

**Project Schedule by Phase/Activity**  
Duration listed in Weeks

<u>Project Phase/Activity</u>	<u>\$20,000,000</u>	<u>\$10,000,000</u>	<u>\$5,000,000</u>	<u>\$2,000,000</u>	<u>\$700,000</u>	<u>\$300,000</u>
<b>Predesign</b>						
Project Assignment	1	1	1			
Scoping	4	4	3			
A/E Selection	4	4	4			
Perform Study	26	20	15			
<b>Subtotal (Predesign)</b>	<b>35</b>	<b>29</b>	<b>23</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Consultant Selection</b>						
Project Assignment	1	1	1	1	1	1
Scope and Cost Verification	4	4	4	3	2	2
A/E Selection	6	4	4	4	2	2
A/E Fee Negotiation	2	2	2	2	1	1
A/E Agreement and NTP	1	1	1	1	1	1
<b>Subtotal (Consultant Selection)</b>	<b>14</b>	<b>12</b>	<b>12</b>	<b>11</b>	<b>7</b>	<b>7</b>
<b>Design</b>						
Schematic Design	17	15	13	10	5	3
Schematic Design Approval	2	2	2	2	1	1
Value Engineering Study *	3	2	2	2		
Design Development & Permits	17	13	11	10	5	5
Design Development Approval	2	2	2	2	1	1
<b>Contract Documents</b>						
Construction Documents	40	30	22	12	8	5
Constructability Review *	3	2	2	2		
Construction Documents Approval	4	4	3	2	2	2
Printing/to Bid	1	1	1	1	1	1
<b>Subtotal (Design &amp; Documents)</b>	<b>89</b>	<b>71</b>	<b>58</b>	<b>43</b>	<b>23</b>	<b>18</b>
<b>Construction</b>						
Bid Period	4	4	4	3	2	2
Contract Award	2	2	2	1	1	1
Contract Notice to Proceed	1	1	1	1	1	1
<b>Subtotal (Bid to Award)</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>5</b>	<b>4</b>	<b>4</b>
Construction Time	90	72	60	44	33	20
Punchlist/Closeout	8	8	6	6	3	2
Commissioning *	8	8	6	6	3	2
<b>Subtotal (Construction)</b>	<b>106</b>	<b>88</b>	<b>72</b>	<b>56</b>	<b>39</b>	<b>24</b>
<b><u>Approximate Project Time (Pre-design not included)</u></b>						
<b>Total in Weeks</b>	<b>216</b>	<b>178</b>	<b>149</b>	<b>115</b>	<b>73</b>	<b>53</b>
Total in Months	54	44.5	37.3	28.8	18.3	13.3
Total in Years	4.2	3.4	2.9	2.2	1.4	1

\* Can overlap with other tasks

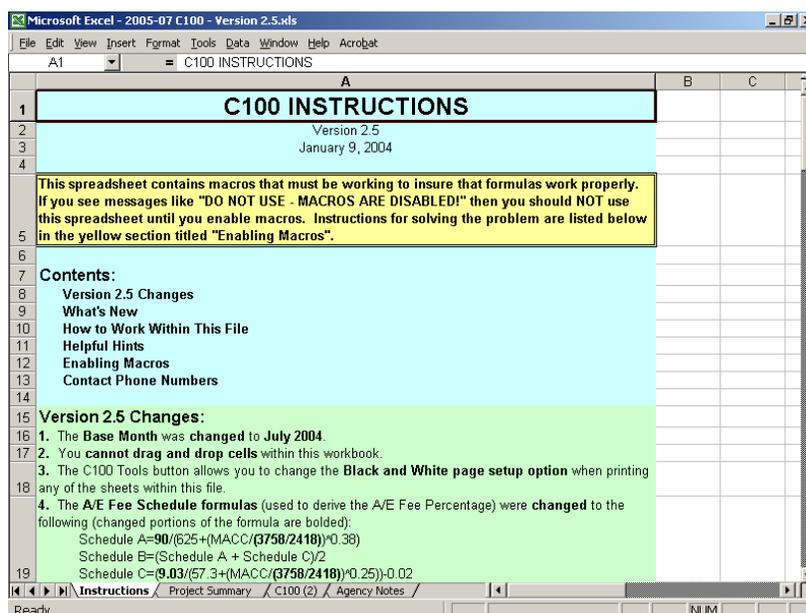
## Using the C100 Workbook

The C100 is an Excel workbook that is protected. Consequently, the worksheets within it cannot be moved or deleted in the usual manner. This protection is necessary to ensure an accurate rollup of the C100 detail in the format required by Capital Budgeting System (CBS) for data import. As a result of this protection, you will find that many Excel functions are disabled while you are working within this file. These differences are listed in the instruction tab within the C100.

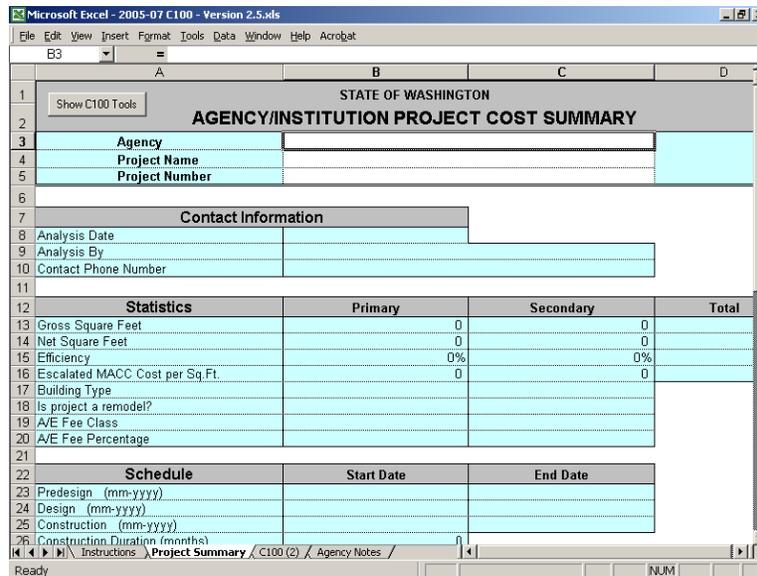
## C100 Worksheets

The C100 contains the following worksheets:

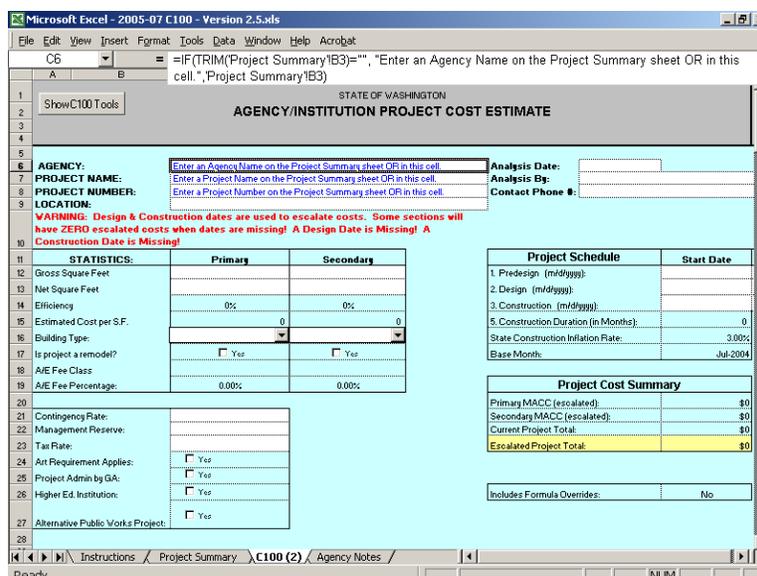
**Instructions worksheet:** Contains a quick summary of new features and instructions on how to use the new features within the file. It also gives some helpful hints on how to work most efficiently, help in getting the macros running, and contact information when you have questions.



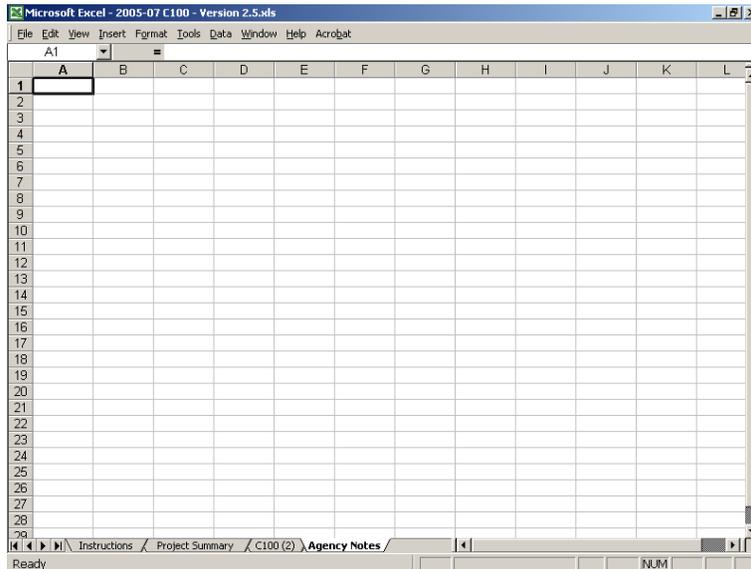
**Project summary worksheet:** Summarizes all C100 worksheets within the C100 to the level required by CBS. Once the entire C100 is completed you can import the data from this worksheet directly into a project in CBS. Or you can enter it manually.



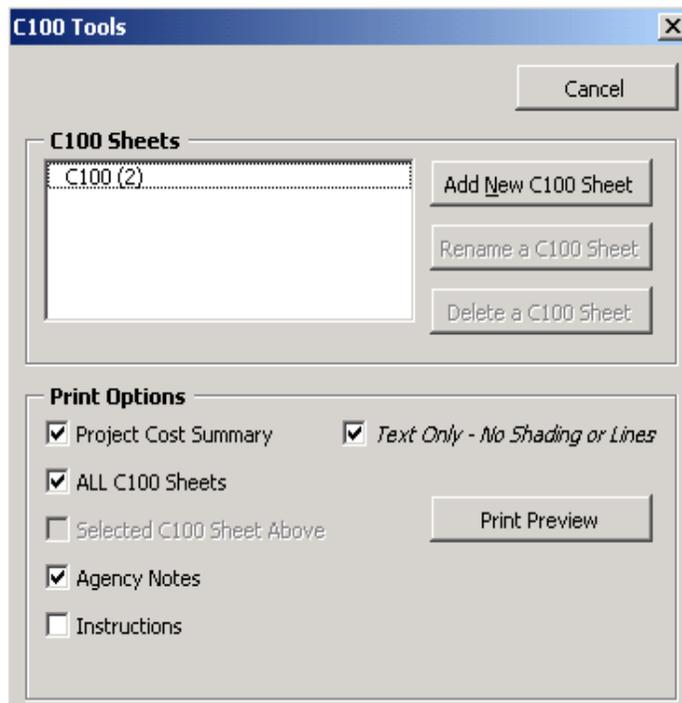
**C100 worksheet:** A cost estimate worksheet for the entire project or a sub project. It uses current year cost estimates, project schedule, type of project and various rates to provide escalated costs of the final project. Each C100 worksheet is calculated independently from other C100 worksheets within the same C100. This allows you to have more than one C100 worksheet within a single C100. For example, you may be repairing the roofs on several buildings at different times during the biennium. In this case, you could have a C100 worksheet for each building. Totals of the entire project are summed up on the Project Summary worksheet.



**Agency Notes worksheet:** Agencies can keep their own notes about the project on this worksheet. It can be formatted and customized by each agency.



**Adding, deleting, renaming and printing worksheets** – Press the “Show C100 Tools” button located in the upper left corner of the Project Summary or C100 worksheets. The following C100 Tools screen will be displayed.



**C100 Options:** The upper section labeled “C100 Sheets” gives you the ability to add New C100 worksheets, rename C100 worksheets or to delete C100 worksheets.

**Add a New C100 Worksheet:** Press the “Add New C100 Sheet” button to add a new C100 worksheet to the C100 workbook using a default worksheet name (e.g., C100(3)).

**Rename a C100 Sheet:** Select one of the C100 Sheets listed under “C100 Sheets”. Press the “Rename a C100 Sheet” button and you will be prompted to enter a new name for the selected C100 worksheet.

**Delete a C100 Sheet:** Select one of the C100 Sheets listed under “C100 Sheets”. Press the “Delete a C100 Sheet” button. You will be prompted to make sure you really want to delete the selected sheet.

**Print Options:** The lower section labeled “Print Options” gives you the ability to preview any combination of the worksheets within the C100. Each selected sheet is properly formatted and displayed in a Preview window so that you can make any last minute adjustments before printing. It also allows you to turn off the shading and lines for a faster print.

**Selecting worksheets:** Select one or more of the worksheets by clicking on the Print Option checkboxes. The “Selected C100 Sheets Above” option will only be enabled when you have one or more C100 sheets selected in the “C100 Sheets” section. A check mark means the worksheet will be included.

**Text only – no shading or lines option:** When this option is checked, no lines or shading will be printed. This speeds up printing.

**Print preview button:** Press this button to preview your selections. You can make adjustments to the formatting and print your sheets from the preview window.

Press the “Cancel” button to close the C100 Tools screen.

**For an electronic version of the C100 to be used for the predesign, refer to OFM’s web site at:** <http://www.ofm.wa.gov/budget/instructions/predesign/contents.asp>. A copy of the C-100 can also be found in Appendix F.

## Building the C100

---

### 1. General Items

- Information and cost data can only be entered in the white cells. Complete ONLY those blanks that apply to your project.

- If an item is estimated to have no cost or is not applicable to the project, leave blank or insert a “0.”
- If text is needed to explain a cost, explain under “Notes” at the bottom of the C100 worksheet.
- Blanks are provided to add items not listed on the form.

## 2. Specific Items

- Under **Project Schedule**, enter the month, day, and year for each phase. Cost adjustment factors for inflation are established by OFM. The C100 will automatically calculate the escalation multipliers and escalated costs.
- In the **Statistics** section, “**Primary**” and “**Secondary**” reference the construction work. Primary work is a new facility; secondary work is remodeling of an existing facility. Because of other automatic calculations in the C100, it is important to enter cost data in the correct and appropriate designations. If data is entered for primary and secondary construction, ensure all statistics are complete, along with the primary and secondary Maximum Allowable Construction Cost (MAA).
- GSF is the “**Gross Square Feet**” of building area contained in the project based on American Institute of Architects (AIA) Document D-101, *The Architectural Area and Volume of Buildings*.
- NSF is the “**Net Square Feet**” area (sometimes called assignable square footage) of a structure that excludes stairwells, elevator shafts, corridors, toilet rooms, and wall thickness. The area should be measured from the predominant inside finish of permanent outer walls to the office side of corridors or permanent partitions, and to the centerline of walls separating adjacent assigned spaces. Where there are interior spaces surrounded by corridors, measurement shall be from the inside face of enclosing walls. Included should be space subdivisions for occupant use. Deductions should not be made for columns and structural projections necessary to the building or for partitions subdividing space.
- The ratio of NSF/GSF is referred to as the building’s “**Efficiency**” and is automatically calculated by the C100. It only applies to buildings. The chart below provides guidelines for various types of buildings.
- The agency’s program space is in terms of net (assignable) square feet (NSF) whereas the construction budget is in terms of gross square feet (GSF). The “**Estimated Cost per S.F.**” is automatically calculated by dividing the escalated maximum allowable construction cost by the GSF. The chart below provides guidelines for various types of buildings.

### Efficiency Guidelines

Space Type	Percent Budget Range
<b>General Government</b>	
Office Buildings	72-78
Computer Facilities	60 – 65
Library Facilities	75 – 80
Auditorium	65 – 75
Cafeteria	65 – 70
Medical	50 – 60
Parking	90 – 95
Warehouse	90 – 95
Laboratory Facilities	55 – 60
<b>Higher Education</b>	
Teaching/Classrooms	65 – 70
Offices/Administration	75 – 80
Teaching/Laboratories	60 – 65
<b>K-12 Facilities</b>	
	80 – 85

### Cost Guidelines

Space Type	\$/sf Average-Max
<b>General Government</b>	
General Office Buildings	150 - 250
Correctional Housing	280 – 320
Parking Structures	100 - 150
Warehouse	100 - 150
Other	55 - 60
<b>Higher Education</b>	
Teaching/Classrooms	170 - 230
Offices/Administration	150 – 250
Teaching/Laboratories	200 – 290

- Selection of a “**Building Type**” establishes the Architect/Engineer (A/E) fee class and associated basic design fee schedule. The C100 automatically enters the fee class and fee percentage.
- The check box “**Is project a remodel?**” adds 2 percent to the basic design service fees to compensate for the added complexity associated with as-built facilities.
- The “**Contingency Rate**” is an allowance for uncertainties associated with estimating costs for design services and construction. Contingency is generally estimated at 3 to 5

percent. The C100 Form will automatically apply the contingency rate to primary and secondary design service fees and Maximum Allowable Construction Cost (MACC). Do not add additional contingency within the MACC or design service fees.

- The “**Management Reserve**” is an allowance for unanticipated changes beyond control of the A/E, construction contractor, or owner. The reserved amount is a function of risk and uncertainty and may be non-existent for some projects; the typical range is 2 to 5 percent for new construction and up to 10 percent for renovation projects. Management reserve is automatically applied to the primary and secondary MACC in Form C100.
- “**Tax Rate**” is the sales tax rate for the location of the project.
- Most major capital projects are subject to allowances for artwork under RCW 43.17.200 or RCW 28B.10.027 for higher education institutions. Check the box “**Art Requirements Applies**” to automatically calculate the artwork allowance for all applicable projects. Higher education institutions should check the box “**Higher Ed. Institution**” to automatically calculate the artwork allowance on renovation or remodel projects.
- Check the box “**Project Admin by GA**” only if the project will be administered by the Department of General Administration (GA) Division of Engineering and Architectural Services (E&AS). Capital appropriations for cost to an agency/institution for project management/administration are limited to specific tasks (see Section 5). Agencies/institutions who are clients of E&AS receive no additional, separate capital appropriations for project management. (See Part 4 below.)
- “**Alternative Public Works Project**” checkbox identifies this project as qualifying and programmed to use alternative public works contract processes as defined in RCW 39.10. This checkbox allows entry for cost estimates associated with design-build and general contractor/construction manager types of contracts. (See Part 3 below.)
- The **Project Cost Summary** data is automatically retrieved from the appropriate sections of the C100.
- **Formula Override** options are available (as “white boxes”) for many cost entries throughout the C100 Form to allow for better, refined cost estimates. Generally, the override amounts should be less than the calculated amount. Provide explanation of all override entries in the “Notes” section at the bottom of the C100.
- **Acquisition Costs** include not only the cost of purchasing or leasing a site and/or facilities, but also all attendant costs necessary to prepare the property for agency use. The costs of site improvements, right-of-way, or conditions on the purchase/lease must be considered under the cost of acquisition if such items are required in order to prepare the property for its intended purpose. Although many of these costs may be deferred to a construction cost, they should be considered during the site evaluation process.
- **Consultant Services** are costs associated with architect and engineering (A/E) services from private consulting firms. **Basic Design Services** fees are automatically calculated by the C100 based on the selection for “Building Type.” The calculated fees are the maximum amount; lower amounts can be entered in the form. Several subheadings are

included in the Consultant Services Section as a suggested listing of extra services that may be required to design the project. Agencies may add specific A/E services in order to fully capture all services needed for a successful project. Extra service costs include: costs to comply with completing the Predesign Manual requirements and the Environmental Impact Statement (EIS), which is a study of the present and future impact of the project on the environment, residents, and the economy. Agencies should review State Environmental Policy Act (SEPA) Rules WAC 197-11 for more information. Refer to the 2005-2015 Capital Budget Instructions Appendix B, OFM's *Guidelines for Determining Architect/Engineer Fees for Public Works Building Projects* (<http://www.ofm.wa.gov/budget/instructions/capinst/05-15capinstr/default.asp>) for details.

- **Construction Contracts** cost estimates are displayed using the *UNIFORMAT II — Standard Classification for Building Elements and Related Sitework System* (ASTM Standard E 1557). Using UNIFORMAT II ensures consistency in the economic evaluation of building projects over time and from project to project. “**Sitework**” costs are associated with site preparation and utility improvements external to the building footprint. “**Related Project Costs**” include on and off-site mitigation improvements imposed by local building/development jurisdictions. The elements listed on the C100 under “**Facility Construction**” are the UNIFORMAT II components common to most buildings. Project specific elements can be entered as well.
- The **Maximum Allowable Construction Cost** (MACC) is the summation of the cost estimates for the sitework, related project costs and facility construction.
- **Equipment** includes the costs of equipment and furnishings integral to the project. Equipment is not considered consumable and is obtained through contracts or the Office of State Purchasing within the Department of General Administration. Furnishings include items such as furniture, office equipment and other purchased items. Special construction items include the purchase and installation of office furniture, shelves, movable partitions, and any special program items that are not considered consumables and have a life expectancy of one year or more. See Section 4 of the 2005-1015 Capital Budget Instructions (<http://www.ofm.wa.gov/budget/instructions/capinst/05-15capinstr/default.asp>) for further guidance.
- **Other Costs** may include lease purchases, temporary utilities, security and/or escort services anticipated integral to the completion of a capital project. Costs of required permits and local jurisdiction fees (including building permit fees, plan check fees, impact and other permit fees) as appropriately imposed should be itemized in this section. (Do not include costs for permits, fees or bonds associated with the provisions of the general conditions of the public works construction contract since those costs are included in the estimates for the MACC.)

### 3. Alternative Public Works Contracts

Cost estimates associated with either the design-build or general contractor/construction manager (GC/CM) alternative public works contract methods should be specifically identified and itemized in the appropriate sections on Form C100.

- **Consultant Services Section:**

**Extra Services, Separate Bid Packages** - The additional cost to the A/E for preparation of separate bid packages not included in the traditional design/bid/build process (GC/CM only).

- **Construction Contracts Section:**

**GC/CM Risk Contingency** - maximum amount of 5 percent of the MACC may be added to the GC/CM MACC (but not the A/E fees).

**Preconstruction Services** - maximum amount of 5 percent of the MACC may be added to the GC/CM MACC (but not the A/E fees) for participation in preconstruction design meetings, life cycle cost design considerations, value engineering, scheduling, design cost estimating, constructability review, project management services, devising alternative construction options for cost savings and planning for sequencing of the work.

**Fee** - estimate for the fixed percent fee bid by the GC/CM multiplied by the MACC.

**Bid General Conditions** - estimate for temporary work and fees performed by or paid by the GC/CM to accomplish the scope of work.

### 4. Engineering and Architectural Services

The Department of General Administration's Engineering and Architectural Services (E&AS) provides project management services to state agencies as required by RCW 43.19.450. E&AS project management services are funded separately from the agency's capital budget request (except when the total project funding is greater than \$20 million or the funding is from a non-state source). The services are essential and mandated activities defined as core services and are included in E&AS's responsibilities list for general public works projects of normal complexity.

The department may negotiate agreements with agencies for additional fees to manage projects financed by financial contracts, other alternative financing, projects with a total value greater than \$20 million, or for the nonstate funded portion of projects with mixed funding sources. Additional fees for Engineering and Architectural Services should be included in the C100. Please contact the GA Division of Engineering and Architectural Service at (360) 902-7227 for an estimate of project management costs.

In addition, for agencies using E&AS for project management, if you intend to use formal alternative public works procedures such as Design-Build or General Contractor/ Construction Management, additional project management costs may be required and should be included in the capital budget request. Please contact E&AS for an estimate of these supplemental project management costs.



## APPENDIX F **Forms**

Predesign Capital Project Request Report Summary (previously Form C-2)

Agency/Institution Project Cost Estimate (updated for 2007-09), Form C-100

Benefit and Life Cycle Cost Analysis Summary, Form C-3



<b>PREDESIGN CAPITAL PROJECT REQUEST REPORT SUMMARY</b>		(Rev. 6/01)
---	--	-------------

AGENCY NAME					AGENCY CODE	
PROJECT TITLE				TYPE		PROJECT NUMBER
PLAN PRIORITY	OFM PRIORITY	PREVIOUSLY	COUNTY	CITY		LEGISLATIVE DIST.
WAS PROJECT INCLUDED IN PRIOR 10 YEARS? S?PLAN? (9)			IF YES, WHEN?	PREV. PROJECT #		

PROJECT DESCRIPTION		Project Mgmt by GA?	
a. Problem/Justification/Why is this project needed?			
b. Proposed Solution/Benefit to public service, strategic goals?			
Complies w/GMA?			
c. Pre-design Issues			
RELATED COSTS Operating budget costs/savings required for this project including staff and cost of maintenance		FTE;	/ \$ per fiscal year

PROJECT STATISTICS											
PROJECT LIFE	Net Project Size (sq. ft.)				Gross Project Size (sq. ft.)				Cost Per Gross Square Foot		
	New	Remodel			New	Remode			New	Remodel	
Building Type:					PROJECT SCHEDULE (20)				ADJUSTED CAPITAL COST		
Project Phases	BASE COST (7/02)				START	COMPLETE			%	COST	
ACQUISITION COSTS											
DESIGN CONSULTANT SERVICES											
CONSTRUCTION CONTRACT COSTS:											
MACC											
___% Contingency											
_____ % TAX											
CONSTRUCTION SUBTOTAL											
EQUIPMENT (include tax)											
ARTWORK											
OTHER COSTS											
CONTRACT ADMINISTRATION											
TOTAL COST											

<b>ANALYSIS DATE:</b>								<b>ABBREVIATIONS</b>		
<b>PREPARED BY:</b>								Assignable Sq Feet (ASF)		
<b>PHONE NUMBER:</b>								Full-Time Equivalent Student (FTE)		
								Weekly Student Hours (WSH) = student hours per week in room		
								Room Utilization Rate (RUR) = hours per week room is scheduled for use		
								Number of Stations (N) = desks or lab stations		
								Station Occupancy Ratio (SOR) = percent of stations used during scheduled use		
<b>A.</b>	<b>ROOM TYPES</b>	<b>ASF</b>	<b>N</b>	<b>FTE</b>	<b>WSH</b>	<b>RUR</b>	<b>SOR</b>			
	Classroom									
	Dry Lab									
	Wet Lab									
	Computer Lab									
	Faculty Office		n/a	n/a	n/a		n/a			
	Student Assembly		n/a	n/a	n/a		n/a			
	Non-Assignable Rooms		n/a	n/a	n/a	n/a	n/a			
<b>B.</b>	<b>OPERATING AND MAINTENANCE COSTS</b>							<b>\$/YEAR</b>		
	Utilities									
	Custodial									
	Maintenance									
	Security									
	Landscaping and Ground Maintenance									
	Liability and Hazard Insurance									
	Tenant Improvements									
	Capital Maintenance									
	Management Fees									
	Furniture									
	Moving Expenses									
	Telephone									
	Data Processing									
	Other Equipment									
<b>Total O&amp;M Cost</b>							<b>\$0</b>			

	OPERATING IMPACT						
	Est. Total	2001-03	2003-05	2005-07	2007-09	2009-11	2011-13
Annual Average FTEs (#)	\$						
General Fund-State	\$						
Total Funds	\$						

PROJECT FUNDING							
FUND CODE(S)	ESTIMATED TOTAL COST	TOTAL EXPENDITURES		2003-05 FISCAL PERIOD			
		Prior Biennium	Current Biennium	Reappropriation	New Appropriation		
		\$	\$	\$	\$		
		FUTURE FISCAL PERIODS					
		2005-07	2007-09	2009-11	2011-13		
		\$	\$	\$	\$		

**AGENCY:**   
**PROJECT NAME:**   
**PROJECT NUMBER:**   
**LOCATION:**

**Analysis Date:**   
**Analysis By:**   
**Contact Phone #:**

**WARNING: Design & Construction dates are used to escalate costs. Some sections will have ZERO escalated costs when dates are missing! A Design Date is Missing! A Construction Date is Missing!**

STATISTICS:	Primary	Secondary
Gross Square Feet		
Net Square Feet		
Efficiency	0%	0%
Estimated Cost per S.F.	0	0
Building Type:		
Is project a remodel?	<input type="checkbox"/> Yes	<input type="checkbox"/> Yes
A/E Fee Class		
A/E Fee Percentage:	0.00%	0.00%

Project Schedule	Start Date	End Date
1. Pre-design (mm-yyyy):		
2. Design (mm-yyyy):		
3. Construction (mm-yyyy):		
5. Construction Duration (in Months):		0
State Construction Inflation Rate:		3.00%
Base Month:		Mar-2006

Contingency Rate:   
 Management Reserve:   
 Tax Rate:   
 Art Requirement Applies:  Yes  
 Project Admin by GA:  Yes  
 Higher Ed. Institution:  Yes  
 Alternative Public Works Project:  Yes

Project Cost Summary	
Primary MACC (escalated):	\$0
Secondary MACC (escalated):	\$0
Current Project Total:	\$0
Escalated Project Total:	\$0

Includes Formula Overrides:  No

ITEM	BASE MONTH AMOUNT	FORMULA OVERRIDE	STANDARD FORMULA	ESCALATION FACTOR	ESCALATED COST
------	-------------------	------------------	------------------	-------------------	----------------

<b>A. ACQUISITION COSTS</b>					
1	Purchase/Lease Cost				
2	Appraisal and Closing Costs				
3	Right-of-Way Costs				
4	Offsite Mitigation				
5					
<b>INSERT</b> <--Double-Click Here to Insert a Row					
<b>Total: Acquisition Costs</b>		<b>\$0</b>		1.0000	<b>\$0</b>

<b>B. CONSULTANT SERVICES</b>					
<b>1 Pre-Schematic Design Services</b>					
a.	Programming/Site Analysis				
b.	Environmental Analysis				
c.	Pre-design Study				
d.					
<b>INSERT</b> <--Double-Click Here to Insert a Row					
<b>SubTotal: Pre-Schematic Design Services</b>		<b>\$0</b>		0.0000	<b>\$0</b>
<b>2 Construction Documents</b>					
a.	A/E Basic Design Services - Up to Bidding (69%)	\$0		\$0	
b.	A/E Basic Design Services - Secondary (69%)	\$0		\$0	
<b>SubTotal: Construction Documents</b>		<b>\$0</b>		0.0000	<b>\$0</b>
<b>3 Extra Services</b>					
a.	Civil Design (Above Basic Services)				
b.	Geotechnical Investigation				
c.	Commissioning				
d.	Site Survey				
e.	Testing				
f.	Energy Conservation Report				
g.	Voice/Data Consultant				
h.	VE Participation & Implementation				
i.	Constructability Review Participation				
j.	Environmental Mitigation Services (EIS)				
k.	Landscape Consultant				
l.					
<b>INSERT</b> <--Double-Click Here to Insert a Row					
<b>SubTotal: Extra Services</b>		<b>\$0</b>		0.0000	<b>\$0</b>
<b>4 Other Services</b>					
a.	Bid/Construction/Closeout - 3% of basic services	\$0		\$0	
b.	Bid/Construction/Closeout - Secondary	\$0		\$0	
c.	HVAC Balancing				
d.	Commissioning and Training				
e.					
<b>INSERT</b> <--Double-Click Here to Insert a Row					
<b>SubTotal: Other Services</b>		<b>\$0</b>		0.0000	<b>\$0</b>
<b>5 Design Services Contingency</b>					
a.		0.00%	\$0	\$0	
<b>INSERT</b> <--Double-Click Here to Insert a Row					
<b>SubTotal: Design Services Contingency</b>		<b>\$0</b>		0.0000	<b>\$0</b>
<b>Total: Consultant Services</b>		<b>\$0</b>			<b>\$0</b>

C. CONSTRUCTION CONTRACTS			
<b>1 Site Work</b>			
a. G10 - Site Preparation			
b. G20 - Site Improvements			
c. G30 - Site Mechanical Utilities			
d. G40 - Site Electrical Utilities			
e. G60 - Other Site Construction			
f.			
<b>INSERT</b>	<-Double-Click Here to Insert a Row		
<b>SubTotal: Site Work</b>	<b>\$0</b>	0.0000	<b>\$0</b>
<b>2 Related Project Costs</b>			
a. Off site improvements			
b. City Utilities Relocation			
c. Parking Mitigation			
d. Stormwater Retention/Detention			
e. Wetland Mitigation			
f.			
<b>INSERT</b>	<-Double-Click Here to Insert a Row		
<b>SubTotal: Related Project Costs</b>	<b>\$0</b>	0.0000	<b>\$0</b>
<b>3A Facility Construction - Primary</b>			
a. A10 - Foundations			
b. A20 - Basement Construction			
c. B10 - Superstructure			
d. B20 - Exterior Closure			
e. B30 - Roofing			
f. C10 - Interior Construction			
g. C20 - Stairs			
h. C30 - Interior Finishes			
i. D10 - Conveying			
j. D20 - Plumbing Systems			
k. D30 - HVAC Systems			
l. D40 - Fire Protection Systems			
m. D50 - Electrical Systems			
n. F10 - Special Construction			
o. F20 - Selective Demolition			
p. General Conditions			
q.			
<b>INSERT</b>	<-Double-Click Here to Insert a Row		
<b>SubTotal: Facility Construction - Primary</b>	<b>\$0</b>	0.0000	<b>\$0</b>
<b>Maximum Allowable Construction Cost (MACC) - Primary</b>			
	<b>\$0</b>		<b>\$0</b>
<b>3B Facility Construction -Secondary (By Building System)</b>			
a. A10 - Foundations			
b. A20 - Basement Construction			
c. B10 - Superstructure			
d. B20 - Exterior Closure			
e. B30 - Roofing			
f. C10 - Interior Construction			
g. C20 - Stairs			
h. C30 - Interior Finishes			
i. D10 - Conveying			
j. D20 - Plumbing Systems			
k. D30 - HVAC Systems			
l. D40 - Fire Protection Systems			
m. D50 - Electrical Systems			
n. F10 - Special Construction			
o. F20 - Selective Demolition			
p. General Conditions			
q.			
<b>INSERT</b>	<-Double-Click Here to Insert a Row		
<b>SubTotal: Facility Construction -Secondary (By Building System)</b>	<b>\$0</b>	0.0000	<b>\$0</b>
<b>Maximum Allowable Construction Cost (MACC) - Secondary</b>			
	<b>\$0</b>		<b>\$0</b>
<b>4 GC/CM Risk Contingency - NOT APPLICABLE</b>			
<b>5 GC/CM or Design Build Costs - NOT APPLICABLE</b>			
<b>6 Construction Contingencies</b>			
a. Management Reserve	0.00%	\$0	\$0
b. Allowance for Change Orders	0.00%	\$0	\$0
c.			
<b>INSERT</b>	<-Double-Click Here to Insert a Row		
<b>SubTotal: Construction Contingencies</b>	<b>\$0</b>	0.0000	<b>\$0</b>
<b>7 Sales Tax</b>			
a.	0.00%	\$0	\$0
<b>INSERT</b>	<-Double-Click Here to Insert a Row		
<b>SubTotal: Sales Tax</b>	<b>\$0</b>	0.0000	<b>\$0</b>
<b>Total: Construction Contracts</b>			
	<b>\$0</b>		<b>\$0</b>

<b>D. EQUIPMENT</b>					
1	E10 - Equipment				
2	E20 - Furnishings				
3	F10 - Special Construction				
4					
<b>INSERT</b>	<-Double-Click Here to Insert a Row				
	<b>SubTotal: Equipment</b>		<b>\$0</b>	0.0000	<b>\$0</b>
99	<b>Sales Tax</b>	0.00%	\$0	\$0	
100					
<b>INSERT</b>	<-Double-Click Here to Insert a Row				
	<b>SubTotal: Sales Tax</b>		<b>\$0</b>	0.0000	<b>\$0</b>
<b>Total: Equipment</b>			<b>\$0</b>		<b>\$0</b>
<b>E. ARTWORK</b>					
1	Project Artwork		N/A	N/A	
2	Higher Education Artwork		N/A	N/A	
3					
<b>INSERT</b>	<-Double-Click Here to Insert a Row				
<b>Total: Artwork</b>			<b>\$0</b>	1.0000	<b>\$0</b>
<b>F. OTHER COSTS</b>					
1	Mitigation Costs				
2	Hazardous Material Remediation/Removal				
3					
<b>INSERT</b>	<-Double-Click Here to Insert a Row				
<b>Total: Other Costs</b>			<b>\$0</b>	0.0000	<b>\$0</b>
<b>G. PROJECT MANAGEMENT</b>					
1	Agency Project Management		\$0	\$0	
2					
<b>INSERT</b>	<-Double-Click Here to Insert a Row				
<b>Total: Project Management</b>			<b>\$0</b>	1.0000	<b>\$0</b>
<b>GRAND TOTAL</b>			<b>\$0</b>		<b>\$0</b>

**NOTES**

<b>STATE OF WASHINGTON</b> <b>BENEFIT AND LIFE CYCLE COST ANALYSIS SUMMARY</b>	<b>FORM</b> <b>C-3</b> <b>(Rev 6-01)</b>
---	--

AGENCY: _____	ANALYSIS TYPE: LCC
PROJECT: _____	ANALYSIS DATE: _____
LOCATION: _____	ANALYSIS BY: _____
Economic Life: ____ Yrs    Discount Rate: ____	FILE NAME: _____

Description	Alternate No. 1		Alternate No. 2		Alternate No. 3	
	Estimated Cost	Present Worth	Estimated Cost	Present Worth	Estimated Cost	Present Worth
<b>1. Initial Costs</b>						
A. _____	_____	_____	_____	_____	_____	_____
B. _____	_____	_____	_____	_____	_____	_____
C. _____	_____	_____	_____	_____	_____	_____
D. _____	_____	_____	_____	_____	_____	_____
E. _____	_____	_____	_____	_____	_____	_____
F. _____	_____	_____	_____	_____	_____	_____
G. _____	_____	_____	_____	_____	_____	_____
<b>Total Initial Cost (PW)</b>						
<b>Total Initial Cost Savings</b>						
<b>2. Replacement/Salvage Costs</b>						
Year    PW						
A. _____	_____	_____	_____	_____	_____	_____
B. _____	_____	_____	_____	_____	_____	_____
C. _____	_____	_____	_____	_____	_____	_____
D. _____	_____	_____	_____	_____	_____	_____
E. _____	_____	_____	_____	_____	_____	_____
F. _____	_____	_____	_____	_____	_____	_____
G. _____	_____	_____	_____	_____	_____	_____
H. _____	_____	_____	_____	_____	_____	_____
<b>Total Replacement/Savings (PW)</b>						
<b>3. Annual Costs</b>						
Dif.    PWA Escal						
A. _____	_____	_____	_____	_____	_____	_____
B. _____	_____	_____	_____	_____	_____	_____
C. _____	_____	_____	_____	_____	_____	_____
D. _____	_____	_____	_____	_____	_____	_____
E. _____	_____	_____	_____	_____	_____	_____
F. _____	_____	_____	_____	_____	_____	_____
G. _____	_____	_____	_____	_____	_____	_____
H. _____	_____	_____	_____	_____	_____	_____
<b>Total Annual Cost</b>						
<b>Total Annual Cost (PW)</b>						
<b>Grand Total PW Costs</b>						
<b>Life Cycle PW Savings</b>						
<b>Savings %</b>						



## Glossary of Terms

---

**Acquisition** – This type of project includes the acquisition of land, structures, and buildings. These are fixed assets that have no relationship to the addition or improvement to, or the repair or replacement of, existing fixed assets. An example of an acquisition would be purchase of a tract of land or purchase of a building.

**Addendum** – A written or graphic instrument issued by the architect before execution of the construction contract that modifies or interprets the bidding documents by additions, deletions, clarifications, or corrections.

**Addition** – An addition expands or extends an existing fixed asset. An example of an addition would be the construction of a new wing for a correctional institution. New construction attached to an existing structure as an extension is an addition. Generally, additions involve alterations within existing buildings to make connections.

**Additional Services** – Professional services that may, if authorized or confirmed in writing by the agency or institution, be rendered by the architect or other consultants in addition to the basic services identified in the owner-architect agreement. (See Form C100, Sections B3 and B4.)

**Additive Alternate Bid** – An amount stated in the bid to be added to the amount of the base bid if the corresponding change in work, as described in the bidding documents, is accepted.

**Alternate Financing** – Proposals that cover a wide range of financial contracts that call for the development or use of space by state agencies through a contractual arrangement with a developer or financing entity. Financing may involve the sale of debt obligations (Certificates of Participation (COPs) through the State Treasurer) or funding from a private developer. Title to the property involved may transfer to the state either upon exercise of an option, or at the termination of the contract.

**Alternative Analysis** – Involves identifying different ways of meeting the functional requirements of the program including various construction solutions to a problem or whether to lease, buy, build, or use some other financing techniques. This requires using approaches such as cost-benefit or life-cycle costing analysis to determine comparable costs of alternatives.

**Alternative Public Works** – Refers to public works processes authorized under RCW 39.10 and includes General Contractor / Construction Manager (GC/CM) and Design-Build. In order to use these procedures, the project must meet the criteria (including project size) stipulated in RCW 39.10.

**Architect/Engineer (A/E)** – A party to a contract to provide professional architectural or engineering design services to an agency or institution.

**Artwork Allowance** – The cost of artwork for original construction of any building excluding storage sheds, warehouses, or buildings of a temporary nature, as provided in RCW 43.17.200. All universities and colleges shall compute artwork allowances on the cost of original construction, and on the cost of major renovation or remodeling work exceeding \$200,000, as provided in RCW 28B.10.027. Agencies should compute artwork allowances for original

construction on the basis of one-half of 1 percent of the sum of consultant services, maximum allowable construction cost, and equipment costs on Form C100, Section E.

**Associated (Annual) Cost** – These costs should include any ongoing expenses not included in Maintenance and Operations. These expenses should include all new program and staff costs reasonably assigned to the program housed in the facility. The method of calculation using escalation and discount rates is the same as Maintenance and Operations. Agencies should indicate the base annual associated costs.

**Base Bid** – An offer to do construction work for payment, the acceptance of which constitutes a contract between the contractor who made the bid (the bidder) and the agency or institution who accepted it exclusive of adjustments for additive alternates. Also known as a proposal or a tender; often called a prime bid when made by a construction company that hopes to become the prime contractor, or a sub-bid when made by a company that hopes to become a subcontractor.

**Basic Design Services** – Architectural/Engineering (A/E) Basic Design Services consist of those services described in the Guidelines for Determining Architect/Engineer Fees for Public Works Building Projects in Washington State. These design services include normal architectural, structural, mechanical, electrical, and civil engineering services for the project. (See Form C100, Section B2.)

**Bond** – An obligation by which one party (surety) agrees to guarantee performance by another of a specified obligation for the benefit of a third person or entity (obligee). Examples include bid bond, performance & payment bond. (See Form C100, Section F.)

**Building Renewal** – Improvements to facilities (less than \$1 million), usually to the building envelope or within the building footprint, to prevent deterioration and maintain use of the facility.

**Change Order** – A written authorization provided to a contractor approving a change from the original plans, specifications, or other contract documents, as well as a change in the cost. With the proper signatures, a change order is considered a legal document.

**Claims Review Board** – A method of resolving disputes other than by arbitration or litigation.

**Clerk of the Works** – An outdated term for a representative of the architect or owner who oversees construction, handles administrative matters, and ensures that construction is in accordance with the contract documents. Currently referred to an owner's on-site representative.

**Commencement Date of Construction** – The start of the construction period which is generally characterized by the mobilization of construction forces on the project site.

**Commissioning and Training** – The process for achieving, verifying, and documenting that the performance of a building and its various systems meet design intent together with the operational needs of the owner and occupants. The process extends through all phases of a project, from initial concept to occupancy and operation, and includes the training of maintenance personnel.

**Constructability Review** – The cost for an independent consultant or contractor to determine if a unique or unusual project can physically be built as designed. This is to reduce construction change orders and claims. This review should be conducted at 75 percent completion of the construction documents.

**Construction Document Phase** – The phase of services in which the architect prepares the construction documents from the approved design development documents and assists the agency/institution in preparation of the bidding documents.

**Construction Management (CM)** – Involves a contractual arrangement in which an owner employs an agent-consultant called a Construction Manager to coordinate and manage all of the construction trades. The additional management expertise is usually used on larger, more complex construction projects. However, an owner on a smaller project may acquire a construction manager for their construction expertise to act as the “eyes and ears” for the owner on the project.

**Consultant** – A person or entity who provides advice or services to an agency or institution.

**Consultant Selection Cost** – The cost of advertising and travel for public members of a selection board, if required by RCW 39.80.

**Contingency** – The need for cost contingency is generated by a lack of information, at a particular point in time, for the task being estimated. Appropriate contingency amounts are dependent on the degree of risk present and the extent of the technical challenge surrounding the task. The design contingency legitimately covers uncertainties in a project and should be reduced through each phase of the design. Construction contingencies should be limited to 5 percent on new construction and 10 percent on remodeling work. Contingencies should not be considered as opportunities for extra work or to change original budget decisions.

**Contract Documents** – The drawings, specifications, conditions, agreement, and other documents prepared by the designer that illustrate and describe the work of the construction contract and the terms and conditions under which it shall be done and paid.

**Contractor** – A person, firm or corporation who or which, in the pursuit of an independent business undertakes to, or offers to undertake, or submits a bid to, construct, alter, repair, add to, subtract from, improve, move, or demolish, for another, any building, excavation or other structure, project, development, or improvement attached to real estate or to do any part thereof.

**Corrective Maintenance** – Unscheduled “call-in” requests for repair or replacement of equipment, systems, or facilities that have failed.

**Cost/Benefit Analysis** – An analysis in which consequences of the investment are measured in or converted to economic terms and qualitative benefits.

**Cost Estimating** – An element of basic services in an A/E agreement that includes an estimate of construction cost from quantity surveys and unit costs of building elements for the project. Costs shall reflect the level of design elements presented in the design documents, plus appropriate construction estimating contingencies to encompass unidentified scope ultimately included in the program. Interactive Cost Estimating is additional work beyond basic services in which additional design alternatives are estimated. Independent Cost Estimating, if needed, covers cost estimates by an independent third party contracted to the owner and used to validate cost estimates prepared by the A/E.

**Deferred Maintenance** – Ordinary maintenance activities left unperformed due to a lack of resources or perceived low priority, where deferral of the maintenance activity results in a progressive deterioration in facility conditions or performances. The cost of the deterioration,

including capital costs, operating costs, and productivity losses, is expected to increase if the maintenance activity continues to be deferred.

**Design Build** – A method of project delivery subject to provisions in RCW 39.10 in which the agency/institution contracts directly with a single entity that is responsible for both design and construction services for a construction project.

**Design/Code Plan Check (ICBO)** – The cost for design document plan check that is performed by the International Conference of Building Officials (ICBO) only when required by local code officials. This requirement should be identified in the permit review process.

**Design Development Phase** – The phase of the A/E's services in which the consultant prepares the design development documents, from the approved schematic design studies, for submission to the agency/institution for approval.

**Design Service Contingency** – Includes an allowance for uncertainty in scoping and pricing additional services, covers variability in estimating reimbursables, includes design fees for owner directed changes and includes design fees for changes during construction that are beyond the scope of basic services and are not a result of errors or omissions by the A/E. The total amount for design services contingency ranges from 5 to 10 percent of total consultant services cost depending on the complexity of the project.

**Designer** – A party to a contract to provide professional design services to an owner, often an architect or a professional engineer. Also, one (individual or corporate) who performs the design function in construction, as a package deal, a turnkey project, or a development management project.

**Discount Rate** – The discount rate reflects the time value of money. This should be approximate cost to the state for long-term debt (bonds).

**Economic Life** – Economic life in the context of cost/benefit analysis refers to the span of years necessary to compare similar costs of operating and maintaining alternative solutions. It may not equate to the time required to fully depreciate the structure. The economic life span should be the same for each alternative for a project. The period of time, extending from the date of installation to the date of retirement for the intended service, over which a prudent owner expects to retain the property in order to obtain a minimum cost.

**Energy Consumption Analysis** – Required for major facilities, an energy consumption analysis is prepared by a professional engineer or architect. It evaluates all energy systems and components by demand and type of energy including the internal energy load imposed on a major facility by its occupants, equipment, and components and the external energy load imposed on a major facility by the climatic conditions of its location.

**Energy LCCA Review** – As required by RCW 39.35, the Department of General Administration will review the Energy Conservation Report (LCCA) for a project. The fee for this review shall not exceed \$2,000.

**Energy Management System** – A system that identifies opportunities to improve energy efficiency including a measure that allows: (a) energy consumers to obtain information about their energy usage and the cost of energy in connection with their usage; (b) interactive communication between energy consumers and their energy suppliers; (c) energy consumers to

respond to energy price signals and to manage their purchase and use of energy; or (d) for other kinds of dynamic, demand side energy management.

**Equipment** – See Section 4 for equipment definitions and criteria.

**ESCO** – A firm that contracts with a facility owner or a utility to acquire, design, install, maintain and/or finance energy conservation, cogeneration or renewable energy projects. ESCO's primarily develop, own and operate energy projects with no technical or financial risk to the facility owner or utility. The ESCO can guarantee the energy savings, utility payments, and overall cost of the project.

**Facilities Improvements** – Initial construction, punch-list items, retrofits, alterations, remodeling, renewals, tenant improvements, renovations, adaptations and code improvements, etc., for a facility.

**Facility** – A structure with walls and a roof.

**Facility Preservation** – Improving or restoring the operational and service capacity to extend the useful life of a facility, without significantly affecting the programs and services housed within the facility.

**Fast Track** – A process in which certain portions of the A/E's design services overlap with construction activities in order to expedite the owner's early occupancy of all or a portion of the project.

**Fixed Assets** – A fixed, physically attached, and permanent improvement or real property. Fixed assets are normally those that are capitalized.

**Fixed Equipment** – The cost of objects not considered consumables (i.e., carpets, blinds, drapes, shop equipment, voice and data communications systems, chemical equipment, etc.) to be obtained through State Purchasing.

**Furniture, Fixture and Equipment (FF&E)** – The moveable furniture, fixtures, or equipment that require no permanent connection to utilities or to the structure.

**General Contractor** – The general contractor is a contractor whose business operations require the use of more than two unrelated building trades or crafts whose work the contractor shall superintend or do in whole or in part. A general contractor does not include an individual who does all work personally without employees or other specialty contractors as defined in this glossary. The terms general contractor and builder are synonymous.

**General Contractor/Construction Manager (GC/CM)** – A GC/CM is a firm with which an agency or institution has selected and negotiated a guaranteed maximum allowable construction cost for a project. A competitive selection process is used through formal advertisement and competitive bid to provide services during the design phase that may include life-cycle cost design considerations, value engineering, scheduling, cost estimating, constructability, alternative construction options for cost savings, and sequencing of work. The GC/CM acts as the construction manager and general contractor during the construction phase. The GC/CM process is subject to provisions in RCW 39.10.

**Geotechnical Investigation** – The cost to do soils boring, sampling, testing, and prepare recommendations. The soil boring and sampling process, together with associated laboratory tests, are necessary to establish subsurface profiles and the relative strengths, compressibility and

other characteristics of the various strata encountered within depths likely to have an influence on the design of the project.

**Governmental Purposes** – Any state or political subdivision that has been delegated substantial taxing, police, or condemnation power under state law.

**HVAC Balancing** – The cost to test and balance designed heating, ventilation, and air conditioning systems, including water flows, at the completion of construction.

**Improvement** – A legal term referring to anything erected on and affixed to land (e.g., buildings, roads, fences, and services), which legally becomes part of the land, according to common law and statutory definition.

**Initial Costs** – The same as “first cost” or the cost to provide the service or product in today’s dollars for a project. This is different from life cycle costs or future costs.

**Inspection (On Site)** – The examination of work completed or in progress to determine its conformance with the requirements of the contract documents.

**Instrumentality** – An agency through which a function of another entity is accomplished, such as a branch of a governing body.

**Intangible Benefits** – Benefits that cannot be easily measured and are generally subjective. Intangible benefits often represent the value of the service the agency provides to the public by either providing new services or improving existing services. See Tangible Benefits.

**Lease Development** – A lease development project is defined as an acquisition of space in an existing privately-owned building through a lease that provides for a period of occupancy greater than five years, with an option to purchase, or construction of a privately financed building for purposes of state occupancy. Lease-development projects represent long-term occupancy proposals, but are to be requested and funded from operating funds only.

**Lease/Purchase Obligations (Real Estate)** – Lease/purchase obligations are contracts entered into by the state which provide for the use and purchase of real or personal property, and provide for payment by the state over a term of more than one year. Lease/purchase obligations are one type of lease-development alternative. (See RCW chapter 39.94 "Financing Contracts" for more information.)

**LEED Silver Standard** – The United States green building council leadership in energy and environmental design green building rating standard, referred to as silver standard.

**Life-Cycle Cost** – The capital and operational cost of a construction item, system, or building during its estimated useful life.

**Life-Cycle Cost Analysis** – The identification of a total life-cycle cost of a capital project. Life-cycle cost analysis is defined as the programmatic and technical considerations of all cost elements associated with capital facility alternatives under consideration. These cost elements may include any or all of the following: capital investment costs, financial costs, operations costs, maintenance costs, alternations costs, replacement costs, denial of use costs, lost revenue, and associated costs. Life-cycle costing is expected to reduce the total cost by selecting the correct designs and components to minimize the total cost of service, not only the first cost. For instance, changes to the preliminary design might increase initial cost by lower operating costs and thereby reduce total costs.

**Long-Term Leases** – Those agreements that extend beyond five years (the normal facility lease period). Leases beyond a five-year term will be considered when: the agency has a stable and consistent program to be housed, there is demonstrated economic advantage to the extended term, and the space is used consistent with statewide utilization standards. (Contact the Department of General Administration, Division of State Services/Real Estate Services for more information.)

**Maintenance and Operations (M&O) Costs** – The costs of the regular custodial care and repair, annual maintenance contracts, utilities, maintenance contracts, and salaries of facility staff performing M&O tasks. The ordinary costs required for the upkeep of property and the restoration required when assets are repaired but not replaced. Items under M&O include the costs of inspecting and locating trouble areas, cleaning and preventive work, replacement of minor parts, power, labor, materials, and minor changes in or rearrangements of existing facilities. M&O work is required to preserve or restore buildings, grounds, utilities, and equipment to original conditions or such condition that they can be effectively used for their intended purpose.

**Maintenance and Operations Manuals** – The assembly, tabulation, and indexing of all shop drawings and submittals on all equipment, controls, and systems so that required maintenance and troubleshooting can easily be shown and understood. This is included in A/E Basic Services.

**Major Facility** – Any publicly owned or leased building having 25,000 square feet or more of usable floor space. Major facilities are required to conduct an energy consumption analysis of the operation of its energy systems.

**Major Projects** – Those projects that cost \$5 million or more, or projects that meet the following criteria: have particularly costly elements, are undertaken on a tight design budget or short design schedule, have significant policy implications to a program, or involve state-of-the-art technology.

**Management Reserve** – Management reserve is an allowance for changes beyond control of the owner and recognizes the potential for variances in key assumptions in building efficiency, escalation, sales tax, permit requirements/delays, and off-site development. The amount is a function of risk and uncertainty and may be non-existent for many projects, or range from 2 to 10 percent for others.

**Master Plan** – A document setting forth the concepts and guiding principles for future development of campus facilities, landscaping and infrastructure.

**Maximum Allowable Construction Cost (MACC)** – A cost that the owner stipulates to the design consultant before design begins. The cost is the owner's budget for the construction cost of the project and serves as the parameter in which the design consultant agrees that the construction cost of the design will not exceed.

**Midpoint of Construction** – The date midway between the commencement date and the date of substantial completion.

**Nongovernmental Purposes** – As used in the context of use of bond/COP proceeds to pay the costs of facilities expected to be owned or used by, or to make any loan or grant to, (a) the federal governmental purposes (including any federal department or agency), (b) any private nonprofit corporation (including any 501(c)(3) organization), and (c) any other private entity,

such as a business corporation, partnership, limited liability company, or association. (See definition for governmental purposes.)

**Normal Maintenance** – A systematic day-to-day process funded by the annual operating budget to control the deterioration of facilities, e.g., structures, systems, equipment, pavement, and grounds. Planned maintenance includes the following:

- Scheduled repetitive work, such as housekeeping activities, groundskeeping, site maintenance, and certain types of service contracts.
- Periodic scheduled work (preventive maintenance) that has been planned to provide adjustment, cleaning, minor repair, and routine inspection of equipment to reduce service interruptions

**On-Site Representative** – This is a full- or part-time employee who represents the owner during construction and serves as a liaison between the architect and contractor on major projects.

**Operations and Maintenance (O&M) Costs** – The costs of the regular custodial care and repair, annual maintenance contracts, utilities, maintenance contracts, and salaries of facility staff performing O&M tasks. The ordinary costs required for the upkeep of property and the restoration required when assets are damaged but not replaced. Items under O&M include the costs of inspecting and locating trouble areas, cleaning and preventive work, replacement of minor parts, power, labor, and materials. O&M work is required to preserve or restore buildings, grounds, utilities, and equipment to their intended running condition so that they can be effectively used for their intended purpose.

**Operations and Maintenance Manuals** – The assembly, tabulation, and indexing of all shop drawings and submittals on all equipment, controls, and systems so that required maintenance and troubleshooting can easily be shown and understood.

**Outline Specifications** – An abbreviated set of specification requirements normally included early in the design process.

**Owner** – The first party to the construction contract, who pays the contractor (the second party) for the construction work. The owner is the party who owns the rights to the land upon which the work is done and who, therefore, owns the work. He/she is the client of a designer, a construction manager, a project manager, or a development manager.

**Performance Bond** – A bond issued by a surety company on behalf of a contractor to guarantee an owner proper performance of the construction contract.

**Phased Construction** – Construction in which design and production more or less overlap, thus shortening project time; usually practiced in construction management projects. See Fast Track.

**Predictive Maintenance** – A refinement to preventive maintenance that integrates scheduled maintenance with system monitoring and analysis (e.g. vibration analysis, thermal/energy analysis) to identify inefficient operation or imminent breakdown. Predictive maintenance ideally reduces the cost of maintaining components that are working adequately.

**Present Worth or Present Value** – The economic procedure to account for the time-equivalent value of past, present, or future costs at the beginning of a base period.

**Preservation Project** – Projects that maintain and preserve existing state facilities and assets, and do not significantly change the program use of a facility. Examples would include roof

replacement and exterior renovation, utility system upgrade, and repairing streets and parking lots.

**Preventive Maintenance** – A maintenance strategy where inspections are made or actions are taken on a scheduled basis to reduce service interruptions, reduce the premature failure of facilities, systems, and equipment, and continue efficient operations. Actual inspection and maintenance is performed on pre-specified schedules established by manufacturer or facility manager.

**Primary Purpose** – As used in defining a project type, the identification of the dominant driver behind the project; it is the area where the impact of not correcting the deficiency is most acute.

**Program Projects** – Projects that are intended to accomplish a program goal such as changing or improving the use of existing space, or creating a new facility or asset through construction or purchase. These projects may have a major impact on future operating budgets – such as the construction of a new prison or university branch campus.

**Programming** – The work necessary to define the scope of a project, conduct master planning for future work, or delineate the existing conditions. This work may require field measurements or building systems testing and surveys.

**Project Budget** – The sum established by the agency/institution as available for the entire project, including the construction budget, acquisition costs, costs of furniture, furnishings and equipment, and compensation for professional services and all contingencies.

**Project Delivery System** – Method of how an owner plans to contract a project, i.e., design/bid/build, design/build, GC/CM, etc.

**Real Property** – Property that is fixed, immovable, and permanent. Real property includes land, structures affixed to the land, property affixed to the structures, and in some cases, trees etc., growing on the land.

**Reappropriation** – Unspent funds from the prior biennium approved by the Legislature and reallocated to the agency by OFM during the current biennium.

**Record Drawings** – The revised drawings that truly reflect what was constructed including field verification.

**Reimbursable Expenses** – Amounts expended for or on account of the project that, in accordance with the terms of the appropriate agreement, are to be reimbursed by the agency/institution such as telephone charges and travel expenses in accordance with state guidelines.

**Retainage** – Those portions of cash amounts due to be paid to a contractor for work completed that are held back (retained) by the agency/institution and not paid until some later date; often at substantial completion or at final completion of the work, according to the terms and conditions of the contract and any relevant legal statute; as a security for proper performance of work and fulfillment of contractor's requirements.

**Schedule of Values** – A schedule breakdown on a month-to-month basis by the contractor to show the intended percentage of completed work by the construction trades. The schedule of values is the basis for the amount of the request for payment by the contractor.

**Schematic Design Phase** – The phase of the A/E's services in which the architect consults with the agency/institution to ascertain the requirements of the project and prepares schematic design studies consisting of drawings and other documents illustrating the scale and relationships of the project components for approval by the agency/institution. The A/E also submits a preliminary estimate of construction cost based on current area, volume, or other unit costs.

**Site Survey** – The process of mapping the boundary, topographic, or utility features of a site, measuring an existing building, or analyzing a building for use of space.

**Specifications** – The major part of a project manual (excluding the documented bidding, contract agreement, and the conditions of the contract) discussing the written descriptions of items of work that complement the construction drawings.

**Subcontractor** – A party to a subcontract who does trade work for a contractor (the other party), for work included under the prime contract between the same contractor and an owner; one who is defined as a subcontractor by the prime contract.

**Substantial Completion** – The stage of a project when progress of the work is sufficiently complete so the owner can occupy or utilize the work site for its intended purpose.

**Testing** – This is a technician's services in acquiring and testing samples of materials used in the project as required in the State Building Code such as welds, concrete strength, or bearing capacity.

**Unifomat** – A system for classifying building products and systems by functional subsystem, e.g., substructure, superstructure, exterior closure.

**Useful Life** – An estimate of the total time that an asset is usable and in service.

**Value Engineering (VE)** – VE is a systematic, orderly approach to defining a facility's required function, verifying the need for the function, and creating alternatives for providing the function at minimum life-cycle cost. Value is the lowest life-cycle cost to achieve the required function. VE is a problem-solving system that emphasizes the reduction of cost while maintaining the required quality and performance of the facility. Applied in addition to the regular design process, it is required on all major projects.

**V/E Participation and Implementation** – The extra fee to be paid to the A/E for participation in the required value engineering study and includes incremental costs to implement those changes identified by the study and requested by the owner.